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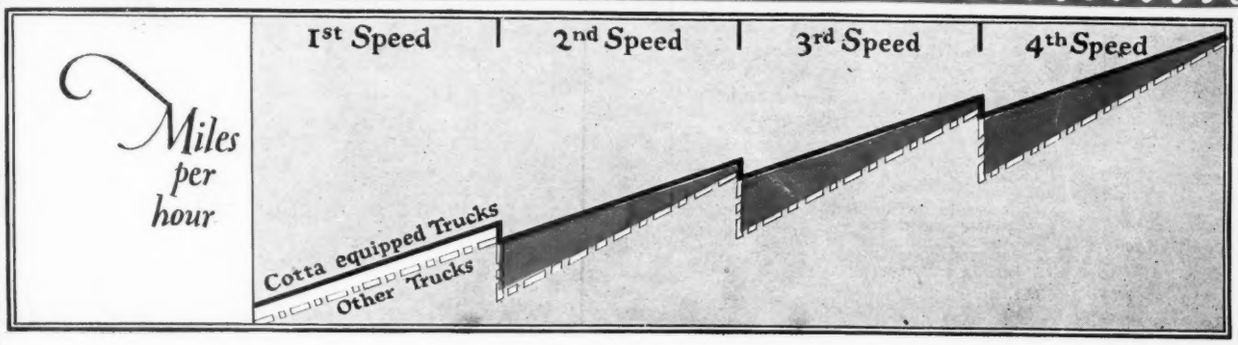

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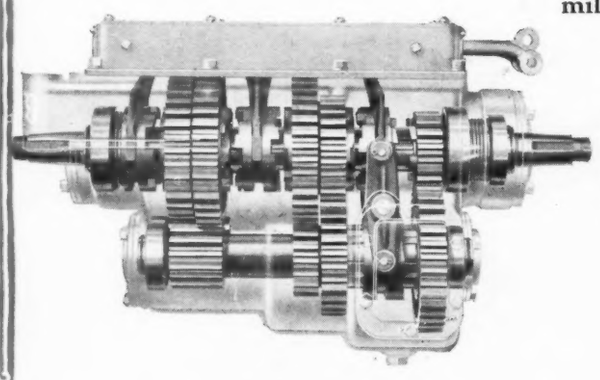

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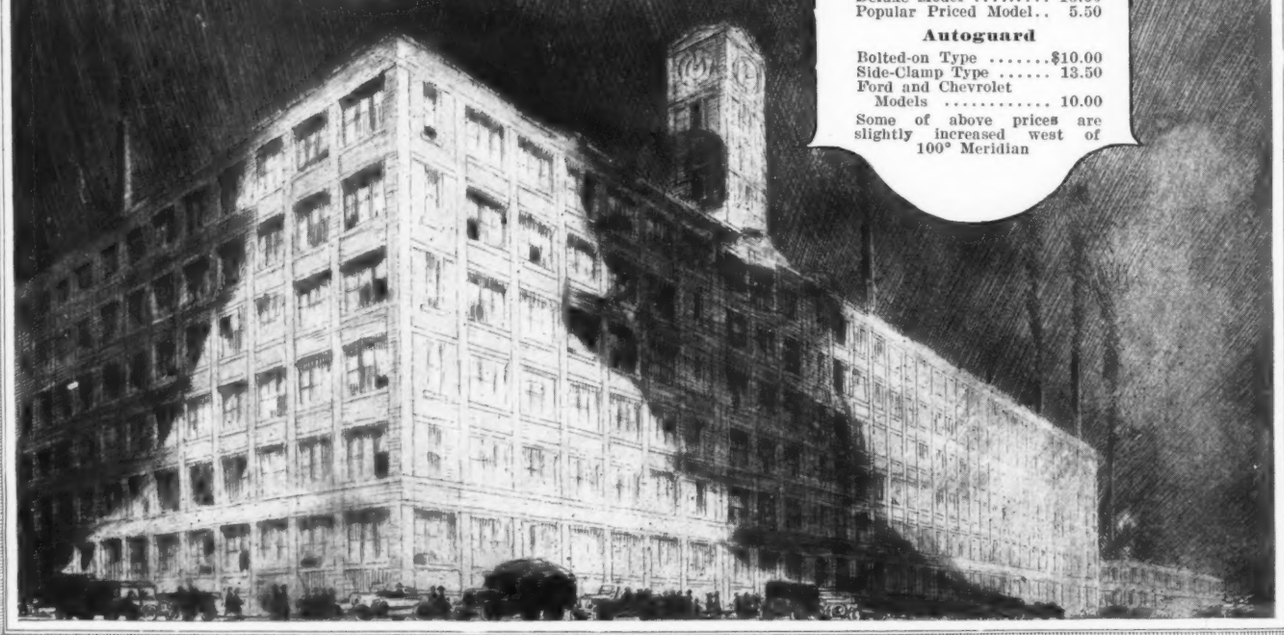


AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XLII NEW YORK—THURSDAY, MAY 20, 1920 NO. 21

The Railroad Difficulties Offer Opportunity, Not Obstacle

Failure of present transportation facilities permits automotive industry to prove that it is a creator, not a consumer, of transportation. Proper organization only is required, the need being immediate.

NEW YORK, May 18.

WHEN there is no transportation industry stops automatically. To all intents and purposes there is no railroad freight transportation in the United States to-day. There is no particular disposition to place the blame upon the shoulders of the carriers. A variety of reasons is responsible. Trying to assess the fault is as profitable as baying at the moon. Manufacturers are confronted with a condition and not a theory.

The automotive industry is in a serious but not necessarily desperate plight. Nothing is to be gained by trying to escape the facts. They must be faced squarely and courageously. There is a solution for every problem and there is a cure for almost every ill. The automobile industry never has struck its colors to adversity and it never will. It is young and strong and virile. Its leaders are resourceful. They never say, "It can't be done," but rather, "It shall be done."

The industry went safely through the perils of war and it will go safely through the perils of peace. It was the first to get into its stride when the roar of the cannon ceased, and because it is striding along so vigorously now it is the first to bear the full brunt of the reaction which was inevitable before the country could recover from the galloping fever brought on by the war.

There must be restriction of passenger car output. That unescapable fact might just as well be admitted first as last. Output already has been restricted, as a matter of fact. It has not been the fault of the industry but of circumstances. It is inevitable that there shall be a still greater curtailment. The extent to which this cutting down of production shall go depends largely upon the manufacturers themselves. If they have the will to keep their plants going they can do it, but they must be willing to sacrifice some of their profits. They must stand on their own feet and live by their own efforts alone. They have asserted that automobiles are transportation. Now they must prove it. Motor trucks were the salvation of the army in France. They can be the salvation of the industry at home.

The individual railroads are helpless to unscramble the jam of motionless freight which has overflowed onto almost every side-track in the country. There are a million tons of steel in the yards of the Pittsburgh district. Probably as many tons of coal are standing in yards about the country. Grain warehouses are bulging with unmoved wheat. The carriers have called upon the Interstate Commerce Commission to aid them in their extremity. It has the authority to operate the railroads virtually as a unit, and it undoubtedly will do so. It may not establish officially the wartime priority list, but it probably will

do so in effect, and that within the next few days.

Food and fuel will be moved first and manufactured products next. Where passenger automobiles will stand on the list of manufactured products is a problem, but they will not be at the top. The Interstate Commerce Commission will bend its first energy to the movement of food and fuel. After that it will try to get unloaded the countless thousands of dead cars now in the yards. How long this process will take even the railroads don't know. It can't be done in days, however. When the present jam is cleared away preference still will be given to food and fuel. The country must be fed and public utilities must be kept going.

Even if the railroads could operate at 100 per cent efficiency, however, they could not hope to handle, with their present equipment, the stupendous quantities of freight offered them. The only solution is more rolling stock. But the railroads cannot be operated efficiently until their labor troubles are cleared up. When that will be, no man can foretell. Even if the railroad labor board grants the wage demands of the various brotherhoods the clouds will not vanish. Thousands of railroad men have grown tired of waiting and have gone into the factories. In many cases their places have not been filled. Where they have been filled the new workers must be trained in their duties and this takes time. The spirit of unrest has bitten the experienced men who have remained at work and it will take months to lead them back to a maximum of effort. The "outlaw" strike never was ended. It is functioning almost as effectively as it did at its inception. Radical agitators are still spreading discontent. Even when the present freight congestion is relieved there undoubtedly will be a worse one in the fall when it becomes necessary to move the new crops.

Factories throughout the country already have felt the inevitable effect of the virtual collapse of transportation. They cannot operate at capacity without raw materials and without shipping facilities they cannot get supplies. They are being forced to lay off men, and the supplying of vehicles to the trade is under a greater handicap than even during the winter. These are difficulties that must be overcome.

Credit is strained to the breaking point and bankers have become stern task-masters. While the railroads are demanding priority in transportation for essentials, the banks are making up their own list of essentials and withholding credit from the lines they think the country could get on without. The Federal Reserve Bank not efficiently, but none the less effectively, has classed passenger automobiles with luxuries. The same story comes from Kansas City, Richmond and Atlanta. Dealers are finding it harder and harder to have their paper discounted. The most flat-footed declaration in this respect has been voiced by M. B. Wellborn, governor of the Atlanta Bank, in an address before the member's council of the New Orleans Association of Commerce:

"A man has no right to borrow money to make or buy automobiles, especially pleasure automobiles and other such non-essentials, and further increase the burden of credits in this country. The reserves in our banks have gone steadily down until to-day only three federal reserves have the legal amount. We have been compelled to take drastic actions to save our funds for those who need them for legitimate production. Farmers and manufacturers who need money for essentials need have no fear. They will get what they need, but loans to manufacturers of luxuries will be cut off. When it comes to non-essentials, I consider that the pleasure automobile heads the list. A tremendous credit is being used in financing time payments on automobiles that should be diverted to essential production."

THE golden days have come for the automotive industry to prove that it is a transportation industry. It should seize the opportunity to prove that it is essential and helpful.

Why not make the automotive industry a producer of transportation not only for itself but for other industries in the present crisis?

Why cannot the automotive industry give up many of its claims to railroad transportation and put itself on its own wheels? The tire companies are doing it and examples could be multiplied of other factories that are kept going by the use of trucks.

Trucks are being turned out at the rate of 1500 a day. Let the industry take the whole output for a few days and it can get along without the aid of the railroads. It can organize regular transportation lines. One manufacturer can help another.

Co-ordinate waterway and highway transport. It is being done now and can be to a greater extent. Let every man connected with the industry co-operate.

The call for conferences that will bring results must be issued.

This is no time for pessimism. The man who faces the crisis with a smile, determination and resourcefulness will win.

The automotive industry knows that only a very small percentage of passenger cars can justly be classed as luxuries, but the fact remains that they have been placed in this classification by the nation's financial engineers. There is every reason to believe that, when the Interstate Commerce Commission, another branch of the Government, makes up what will amount to a priority list, it will not ignore the promptings of the Federal Reserve Board.

Every passenger car manufacturer will feel the pinch. Not only must he fight for credits and freight cars, but he is confronted with a well-defined inclination on the part of steel makers to give preference to railroad orders for equipment. The measure of success which will attend efforts to overcome these obstacles will depend upon individual resourcefulness and determination. Automobile manufacturers are in a better strategic position than men in other lines, for they can "drive away" their product. By the intensive use of motor trucks they can keep their organizations together to await the dawn of a better day.

There are 800,000 motor trucks in the United States. They can be mobilized to meet the present emergency. The army has thousands of trucks which are standing idle. There never will be greater need for them than there is to-day.

Automobile makers can get together fleets of trucks and still more fleets of trucks to bring in their supplies. The railroads probably can be depended upon for fuel. If needs must manufacturers can truck in their steel and their castings. They can haul their engines and parts by truck. All this will cost money, but it will keep the factories going. Unless the plants make automobiles they must close. The use of trucks will permit some of the companies which are carrying sadly unbalanced

(*Continued on page* 1178)

Training the Personnel for Highway Construction and Transport

A look into the future of motor transportation shows that thousands of trained men will be necessary to build and care for the roads and operate the great fleets of trucks that are certain to come. Because of these facts, last week's meeting at Washington becomes of unusual importance.

By Clyde Jennings

THE need of greater educational facilities so that the public might properly benefit by motor vehicles was well set forth in a joint educational conference at Washington May 14 and 15. The conference was called by P. P. Claxton, Commissioner of Education, and was attended by almost 100 persons, divided into three groups, representing educational institutions, highway builders and engineers, and the automotive industry. The latter group included manufacturers of motor trucks and cars and tires.

The object of the conference might well be stated in the words of one of the speakers "to define means of training men who will get a vision of the highway traffic of the future and build accordingly." Specifically set forth in the reports of the three committees, the needs each year for the next ten years were as follows, in addition to the present graduation of such men:

600 College trained highway engineers for service of Federal and State highway departments and for contractors.

600 College trained highway engineers to enter the service of the county, municipal and similar highway organizations.

4000 Specially trained men for service in motor transport ventures, which will include traffic experts to be attached to state, county and municipal organizations, the transport organizations and in business administration.

250,000 Specially trained men for shop foremen, skilled mechanics, business administration and chauffeurs for the rapidly developing field of caring for the vehicles used in motor transport.

The latter group of 250,000 were not in any way confused with the necessity for engineers, but it was the opinion of all that, as the transportation radius of the truck expanded, there was a need of higher type men to work on it. Also that as the truck became a factor in transportation, it must keep all engagements promptly and effectively. It was the opinion of the group which considered this question that this education should be conducted by the various vocational schools, of which the Y. M. C. A. is supplying a type of the education needed. These men answer to the same purpose as the traffic personnel of the railroads.

As to the 4000 men to be specially trained for motor transport work as fleet commanders, sales engineers and business administrators, it was the idea that this work could be conducted in short courses on the various subjects. The candidates for these courses should be either high school graduates with some experience or men who have shown a proper ambition in their industrial work, either in transport or highway work. This work is exemplified by the short courses in the University of Michigan, where twelve two weeks courses are offered in highway training and six in motor transport, each course of two weeks' duration, including 30 lectures on a definite phase of the subject. It was the opinion of the committee that employers would do well to send their men to a school for this work during special vacations, granted for this purpose. It was recommended that at least ten universities install courses of this sort.

As to the need for the 1200 engineers, it was pointed out that at the present rate of education of men in civil engineering courses about 1100 men would be graduated annually and, following precedent of previous years, about 300 of these would go into road work. The need of the federal, state and similar projects would need at least 900 engineers annually. Subtracting the 300 already provided, this would leave an unanswered demand for 600. The county and municipal demand is comparatively new. The idea behind this course was that it could consist of three years of civil engineering, with one year of specialization in roads and pavements.

The need for these men, it was said, would be immediate if it was physically possible to carry out the plans for which more than $800,000,000 had been appropriated for highways during this year. It was said, however, that this program could not be carried out because of a scarcity of materials, railroad transportation and labor. These circumstances would reduce the actual performance.

Following the reports of the committees, the following resolutions were adopted by the conference:

Whereas, American science and industry has forged a new unit of highway transportation which is destined to bring about a far-reaching change in life and thought not only in this country but in the world; and,

Whereas, The problems of highway engineering and of highway transportation engineering are so closely interrelated as to demand not only the highest type of trained men to guide them but an appreciation of the entire problem of highway transportation by both highway and transportation engineers; and,

Whereas, The American people have seen fit to meet the needs of highway transportation with appropriations for hundreds of millions of dollars for better highways, which can only be expended efficiently and intelligently as we comprehend to the fullest extent the economic relationship existing between the roadbed and the motive unit; and,

Whereas, These problems calling as they do for men of the

highest collegiate and vocational preparation, can be solved only as our educational institutions are able to meet this need with increased facilities for research, study and practical application.

Now, Therefore, Be It Resolved, That we, the representatives of education, industry and government, assembled in national conference at Washington, D. C., at the call of the Hon. P. P. Claxton, Commissioner of Education, to discuss this subject and to formulate recommendations concerning it, do hereby concur in the following statements:

That there is no one domestic activity of more vital import to the people of the United States than an efficient and economical administration of our highways.

That there is a pressing demand for trained men not alone to guide the present program but also to undertake the problems of the production and the economic use of vehicles over the highway.

That this need can only be met by increased educational facilities for turning out these men.

That the entire subject is one which should be closely coordinated and a permanent committee made up as hereinafter designated should be appointed by the Commissioner of Education to consider this problem in its several aspects and to bring about a fuller understanding of it on the part of the people of the country.

That the component parts of this committee should represent the Bureau of Education, the Bureau of Public Roads, the Motor Transport Corps, the State Highway Departments, the automotive industry, and the State or private educational institutions, as the groups best equipped to furnish the technical information needed and to work out these great public questions.

Commissioner Claxton will later name this committee and it is likely that the Society of Automotive Engineers will be included. This committee will work in connection with the Bureau of Education to make a practical application of information gathered at this conference and encourage certain schools to take up this work. The attitude of the educators present was that the schools are willing and anxious to take up the work but that they want the work directed toward certain objectives and that they do not all want to enter upon this work and bring about an overproduction of men equipped to handle the problems. The feeling of the practical men present was that there was little danger of overproduction but all realized that there must be certain standards for recommended schools.

The background for this action had been laid in a general session, which was called to order by Commissioner Claxton, who explained that the educators of the country were anxious and willing to meet industrial demands but that they could function to this end only as they knew what were the needs of industry. He spoke of the rapid change of transportation business and the introduction of automotive vehicles as a national factor.

Thomas H. MacDonald, chief of the Bureau of Public Roads, presented the road program. Basing the needs of the future on the large sums already appropriated for road work, he related that 30 states canvassed recently reported that they were 24 per cent short of their engineer requirements. This condition, he said, contributed heavily to the alarming waste of road building funds, because road construction, unless under proper engineering direction, was most often useless. The direction must comprehend the traffic of the future and build accordingly. The 126 engineering schools now working could not supply this demand, as the 5500 men graduated yearly were divided between civil, mechanical, mining and electrical engineering.

Roy D. Chapin, president of the Hudson Motor Car Co., spoke on "The Need for Better Trained Men in Highway Engineering and Motor Transport Engineering." He took the position that the people had been sold on the question of better roads and that the highways would now be provided but there remained the task of economic development of the transportation over them. There was no question in the minds of automotive men of supplanting either railroad or waterway transportation, but of forming with these two a transportation trinity and the automotive transportation must have quickly an organization similar to that which the railroads have built up in gradual development. The enormous waste both in highway construction and its use must be corrected by sound thinking and analysis. The right vehicle must be determined and this must be rightly used. The greatest modern lesson in road building had been supplied by the experiences of the war in England and France, far famed for their wonderful roads but which were found to be inadequate for the modern traffic that was suddenly thrown upon them.

The Technical School

S. P. Capen, Director of the American Council of Education, outlined what was considered necessary for an engineering education in his paper on "What Attitude Should Technical Schools Take Toward the Demand for Training in the New Professional Specialty." Professor Capen deplored a tendency on the part of some schools to endeavor to meet the demands by turning out men hastily educated. He stood for the three years of general engineering training and one year of specialization. He said there was a tendency of schools to spread too widely and in his opinion one school in a state should be sufficient for a highway course.

Dr. Walter C. John, of the Land Grant College Division of the Bureau of Education, outlined what State colleges are doing in this new work and told of the needs for information of the work to be done.

Prof. A. H. Blanchard, of the University of Michigan, briefly outlined the study work in the new "short courses" of that school in both highway work and motor transport. These courses, of which there are twelve relating to highway and six to motor transport work, are of two weeks each. Each short course takes up a certain phase of the work. These courses are open to men experienced in the various practical phases of the work on highway construction and the operation of transport. They do not make engineers of the men, but they make them capable of intelligently aiding and carrying out the work of the engineers.

Following this session the membership of the conference was divided into three committees for consideration of special subjects. The committees were known by these titles:

Highway Engineering Education, Thomas H. MacDonald, chairman.

Highway Transportation Education, George H. Diehl, vice-president National Highway Traffic Association, chairman.

Business Education and Highway Technical Research, Dr. A. F. Woods, president State University of Maryland, chairman.

The reports of the two committes first named are summarized in the lead of this article. That of the third committee was read by George F. Zook, specialist in higher education for the Bureau of Education. It told of the lack of intelligent research now available on the materials for road construction in the various sections of the country and of the various kinds of roadways. It was suggested that there be a central research body and that this body correlate the research conducted by the various state colleges and independent concerns. It was

pointed out that if research could save only 10 per cent of the money expended for roads under the present program, that it would pay a great amount more than the expenses of the education proposed. The part of the schools was stated to be that of interesting undergraduates in the object and methods of research and fitting them to work with graduates in determining the problems.

The members of this conference were often impressed by a single question that they were doing a pioneer work. There were figures to indicate the amount of highway construction contemplated, but the difficulty was to grasp the meaning of these figures. The $800,000,000 appropriated for road improvement in 1920 was rather beyond analysis in detail, but of course this problem became simplified when the road builders made it plain that they could get materials and labor for only a small part of the total.

But again the motor transport committee was puzzled by the question as to how many fleet managers would be required annually for the next five years and where they would come from. The committee was basing its estimates on men required for the handling of one million commercial vehicles now in use and an annual output of 300,000 trucks. But they were rather afraid to venture into future figures, either on actual operation of trucks or the garage feature. All agreed, however, that some miracle men must arise from somewhere if the trucks were to be economically administered and that there was no time to develop a number of traffic men as the railroads had developed them, solely by experience. The need of skilled, self-reliant men in this connection was said to be mutiplying rapidly as the number of trucks in transportation increased.

One of the interesting questions raised was, When does a man become an engineer? This was in a measure answered in the recommendations by the use of the phrases "college trained engineer" and "special trained men" in the recommendations. In the motor transport committee it was quickly found that a definite terminology was needed. There was much confusion of terms. The person who prepared the questions put before this committee included "engineers of automotive design." The committee ruled this out, asserting that the requirements for these engineers are practically 1000 annually, but that this demand is met by mechanical engineering colleges. Following this decision, the committee devoted all of its estimates to the use of the vehicle after it was built. A part of this estimate was for the need of chauffeurs to act as fleet captains as the radius of the truck expands. These chauffeurs will be more than mere drivers, but will be traffic men, expert repair men and men with a general knowledge of loading and the economic use of the truck. Men who can solve questions of road law and a traffic tangle, as well as repair the machinery of any vehicle in his fleet with the tools at hand.

Friday night all of the delegates to the conference were the guests of the National Automobile Chamber of Commerce at a dinner served in the roof garden of the Hotel Washington. Mr. Chapin was toastmaster and host. The speaker of the evening was John Barton Payne, Secretary of the Interior, who introduced himself as a road builder, asserting that he was president of the South Park Board of Chicago. He said that his great problem in this connection was for some engineer to build a road that would stay on the ground. He said that he had stood in the parks and watched their best roads go up in the air. He spoke of roads as an investment in land values only, as well as a social and economical convenience.

Senator Townsend, author of the Federal road bill now pending, was the next speaker and he told of his conception of the necessity for a co-ordinated system of roads and of "building for to-morrow."

H. S. Firestone talked briefly on industrial conditions. He said that he once heard a minister preach on "The Sensible and the Sentimental." That this man described "Sentimental" as something visionary, but he thought that Senator Townsend and others looking to the future of the highways were sensible despite the sentimental vision. He also said that recently he had been asked by the Cleveland Chamber of Commerce to speak before that body and that he had told them that in his opinion it was time for industry to slow down a bit until agriculture and religion caught up with it. He added that he thought the highways promotion was one of the links needed to permit the catching up of agriculture and religion with industry. He was favorable to road building if they were well built and built where they were needed.

Saving on Gasoline

Dr. Claxton next spoke on the possibilities of saving by roads and he said that good roads wherever automotive vehicles traveled would save their cost on maintenance in gasoline alone. He placed this saving at $250,000,000 annually.

Road classification as to its future use has become a very serious problem, according to Thomas H. MacDonald, the next speaker, and yet this is but one of the problems before the engineers of to-day. Their task is made greater by the increase in cost per mile of roads necessary to maintain the growing traffic.

Dr. Woods told how a modern educator picks men with horse sense and fits him to handle the higher problems of the day.

A. G. Batchelder of the American Automobile Association, closed the speech making with the cream of the stories he has heard during his many years of good roads campaigning. And thus ended a very pleasant party.

Before adjournment the conference gave a rising vote of thanks to Pyke Johnson of the N. A. C. A., and Dr. Walton C. John of the Bureau of Education, for their work in making possible the conference. A similar expression to Dr. Claxton and his bureau was voted.

This meeting was complementary to one held at Ann Arbor on April 15, where the need of such education, as outlined by this course, was reviewed. The Washington conference was arranged to conform with the views expressed at the previous meeting.

The conference departed somewhat from its set course to adopt a resolution favoring the instruction of pupils in all schools on rules of the road and traffic safety. The representatives of the Bureau of Education were willing to undertake the promotion of this work as much as possible to avoid preventable accidents.

Book Review

INVENTIONS—Their Development, Purchase and Sale. By Wm. E. Baff. Published by D. Van Nostrand Co., New York. Price, $2.00.

According to the author's preface, the book is a manual on the marketing of inventions. It discusses such questions as the value and price of inventions, gauging the merits of an invention, gleaning the talking points of an invention, etc. Directions are given for procedure in organizing companies to exploit inventions.

The United States as a Trader in the World Markets

What is the position of this country in relation to its foreign trade and how may it hold the business that came to it during the war? The answer to these and other questions are attempted here by Mr. Beecroft in reporting the Foreign Trade Convention held last week at San Francisco.

By David Beecroft

SAN FRANCISCO, May 15.

BEING a creditor nation is a handicap to our foreign trade and, in order to hold the overseas trade we have, it is necessary that we should afford to foreign countries every facility to sell their raw materials to us. Foreign trade is not simply selling our products abroad; it consists also of buying foreign materials and products. These nations have not gold enough to pay us for all the products they require from the United States, and if we insisted on payment in gold bankruptcy would follow in some cases.

These are the general conclusions of the 2500 delegates who for four days have been in session here at the seventh annual convention of the National Foreign Trade Council, the largest in the history of the organization. There have been meetings during the forenoons, afternoons and evenings and from 1000 to 1500 men have attended the general sessions. Fifteen group conferences to consider topical subjects have been held and the attendance at these has averaged more than 500. Interest has been greater than ever before in foreign trade.

The exchange situation was perhaps one of the most important topics before the assembled business men. As to this, they believe that it is impossible by any form of legislation to correct this condition at once. Time will be required to bring the exchange back to normal and there is a possibility that in some instances the rates may never regain the pre-war figures. To overcome these handicaps to American business, our manufacturers must establish themselves in greater numbers in foreign countries and have their export trade handled by Americans rather than by citizens of other countries.

But Congress must legislate so that American business houses abroad are given that protection which other world trade nations are giving to their business interests in the countries of the world. Our government also must insist that other governments give to our business firms in their lands that same measure of security which we accord to business men of foreign countries here in the United States. Our government has been lax in insisting on such protection for our business interests.

In order that we may compete better with foreign nations in the export trade, the 1500 vessels in the Shipping Board fleet should be sold at once to private ownership at rational prices and permitted to operate without restricting governmental dictation. Those not sold should be chartered and given free scope without limitations as to routes. More passenger vessels must be put in the South American trade.

Our tariff must be handled so as to meet foreign trade needs due to the tariff manipulations of other countries. Tariffs on imports from countries not showing trade favors toward us may be necessary. The tariff matters of the entire world are in a reformation stage and we must have flexibility to meet them. Greater appropriations for our tariff commission must be had.

Our export trade is handicapped by intolerable mail, cable and wireless facilities. Our cable service is inadequate, chiefly with the Orient, and should be increased. The wireless service is insufficient. The mail service is too slow and not otherwise efficient as compared with competing nations. The post-office is doing a commendable work by increasing from 42 to 180 the number of countries with which we have an international parcel post.

We are held back by inefficiency in our consular service and legislation should be enacted to put the personnel of this service on a merit basis. Our schools and colleges should provide training courses in foreign trade. Scientific education must be had and this must be supplemented by practical training courses by industrial concerns.

Production in American factories must be stimulated to meet domestic demand and provide that proportion necessary for export trading. More American banks must be established abroad to assist trade and furnish credit information. More associations for co-operative selling as permitted under the Webb law should be formed.

It is imperative that America assist actively in relieving Europe, which is in a chaotic state in many countries. The transportation systems are disorganized and production has nearly ceased in several countries. It may be necessary to institute some form of barter or exchange of commodities, as several industries are attempting in order to get reconstruction started. Manufacturers in America must be encouraged to utilize the raw products of foreign nations.

Every business man who attended the convention here seems to realize that being a creditor nation has so handicapped our foreign business that unusual efforts are needed to hold the trade forced upon us by the war. The sentiment is that we will be doing well if we can hold what we have.

Congress must give more aid than it ever has given before to our trade. Our merchant marine must be unhampered. Government control must stop. Our business enterprises abroad must be protected. Our consular service must be more efficient. Our banks must expand abroad. Our manufacturers must advance in direct foreign selling rather than have our foreign offices in the hands of foreigners.

We should establish free zones in several of our ports to assist our merchant marine in getting business both ways. Congress must enact laws to protect our business

men in China, so that they will not have to operate in ports under the laws of foreign countries trading there, as China does not have laws applying to foreign firms. The 2500 delegates favored an immediate treaty of peace that will be honorable to the United States.

A. C. Bedford, chairman of the board of directors of the Standard Oil Co., asked specifically that Congress give our oil companies protection in foreign fields on a par with that afforded to oil operators of other countries. Such protection has never been given, Congress having looked upon our interests operating abroad rather as foreigners than as citizens of this country.

Oil operators of the United States have been caught napping in looking after supplies of oil in other countries. British interests have been unusually active. The war gave a new significance to petroleum and the country that controls petroleum supplies will control the trade of the world.

America has not more than a three months' reserve; consequently, we must prosecute vigorously both our production and our importation of petroleum. We imported 55,000,000 barrels last year from Mexico; this year we should bring in some 80,000,000, and more is needed.

There is a shortage of crude oil to-day, but the high prices for crude will stimulate production and increased importation will overcome the present shortage. But this is necessary, in view of the 1780 per cent increase in motor cars, trucks and tractors from 1909 to 1918, while our gasoline facilities have increased no more than 518 per cent during the same time. We must have more economical engines, with carbureters better adjusted, piston rings fitted tighter, brakes more efficiently adjusted and every other step taken to conserve gasoline.

The oil companies are building fleets of tank steamers and endeavoring to obtain control of foreign oil fields. In Mexico, Colombia, Venezuela and Peru, American oil companies are struggling against unjust discrimination and are not getting a square deal. Congress is not backing them up. The people must get behind Congress so that it will give this necessary protection, as in some fields, for instance, American concerns must operate under British charters in order to get the necessary protection. American oil companies will meet the world in competition if that competition is fair.

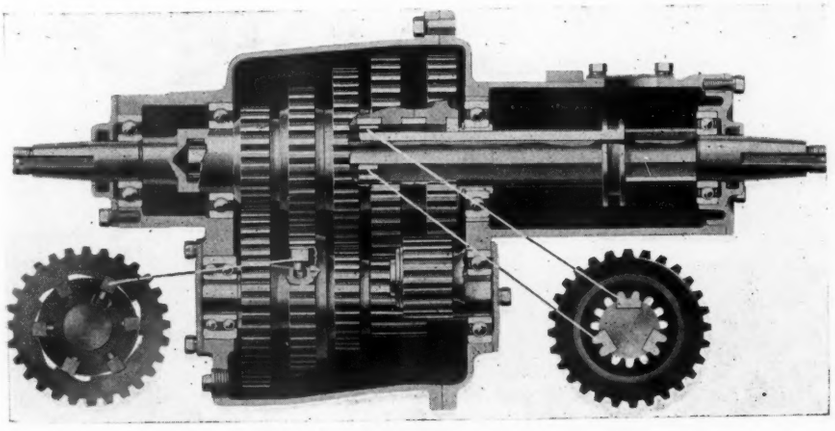
A New Sliding Key Transmission

COMBINING a sliding key and over-running clutch feature, the Power-Rite transmission gearset is controlled from the steering post instead of by the customary shifter lever. The gearset is a constant mesh type in which the speed changes are made by sliding keys which pick up internal teeth in the gears. These changes are affected by a lever on the steering post similar to the spark or throttle lever. When the speed control lever is moved on the quadrant the motion is transmitted to the three sliding keys in the gearset. These keys are actuated in longitudinal grooves of the main transmission drive shaft and engaged with the internal teeth of the gear selected. This method of operation is claimed to give silent shifting under all road and load conditions.

The drive gears are mounted on large bronze bearings and rotate independently of the driving shaft, except when keyed to it. Thus, driving motion is transmitted only when the set of keys is engaged with one of the gears. In the four-speed truck gearset shown in the accompanying illustration there is a special rachet mounting of the second and third speed countershaft gears which permits of driving only in one direction. Thus, in running down hill or at any other time when the truck is running ahead of the engine, it is allowed to run free by means of this over-running clutch when the second or third speed gear is engaged.

With the over-running clutch feature there is no clash in shifting down while the truck is running at either low or high speed, since it no longer becomes necessary to match up the speed of the rotating gears. It has been possible on tests to throw the gears from forward to reverse without clash. A feature of the design is the ease of assembly, the box being so arranged that each shaft can be assembled separately with the bearings all in place and the two halves of the case then bolted together.

The Detroit Transmission Co., manufacturer of this gearset, has secured the plant formerly occupied by the M. & S. Gear Corp. and is equipping the factory for an initial output of 100 transmissions per day. It is expected that deliveries will start in July.



Power-Rite power key transmission

Grinders for Dressing Off Gas and Arc Welds

AN alternating and direct current aerial grinder for dressing off the overflow metal along the welding line has been developed by the Van Dorn Electric Tool Co. Each of these grinders is suspended on a spring with 12 in. extension and 8 x 1 x ½ in. guarded wheel. The D. C. grinder and three-phase A. C. grinder are ½ hp. and the single-phase A. C. grinder is ⅓ hp., AIEE rating. In all three types the end plate and extension spindle housing are made of steel; in the D. C. type the motor housing is also steel, but in the ⅓-hp. and ½-hp. A. C. types this is of aluminum to keep down the weight. Both types are equipped with ball bearings. The shaft is locked to the inner races, to provide for end thrust and eliminate shaft wear. These tools are adapted for all kinds of light grinding and for dressing off arc welding of window and door sash in passenger car building, polishing, etc.

Advantages of Pneumatic Tires for Trucks

Since beginning to use pneumatics in place of solid tires on rural free delivery mail trucks, the Post Office has largely given up carrying spare tires since they have so little use for them. Punctures and blowouts are of rare occurrence. Speaker at S. A. E. meeting shows other advantages.

At the May meeting of the Metropolitan Section of the S. A. E., held at the Automobile Club of America on the evening of the 13th, William V. Logan, who is connected with the United States Tire Co., spoke on the subject of pneumatic tires for trucks. Mr. Logan said that to-day there was absolutely no question of the desirability of pneumatic tires for trucks of 2½ tons load capacity and under for any class of service. The pneumatic tire was superior to both the solid rubber and the cushion tire, which he put in the same class. Among the advantages resulting from the use of pneumatic tires for trucks of this class, he mentioned increase in traction, reduction in the breakage of fragile goods transported, reduced wear and tear on the truck, reduced fuel and oil consumption, reduced expense for repairs and preservation of the highways, besides the chief advantage of increased speed and consequent greater calling radius.

Mr. Logan said that in attempting to sell pneumatic tires to manufacturers and truck owners, they were constantly confronted with the argument of the increased price of pneumatic equipment. He said that the increased calling radius of a truck pneumatically equipped alone made up for this increased cost. With a proper tread design far greater traction can be obtained with pneumatic tires. Concerns like the Wanamaker and Altman stores can no longer afford to use solid tire delivery vehicles on account of the very considerable damage and breakage of goods carried occurring with such vehicles.

The depreciation of delivery wagons equipped with pneumatic tires was considerably less than that of solid tired vehicles. It was customary to charge off 20 per cent per annum where solid tires were used, but it had been found that 15 per cent was sufficient with pneumatic tires. These were the figures used in practice by the U. S. Tire Co. This reduced depreciation alone warranted the increased first cost of pneumatic equipment.

Mr. Logan referred to a remark made by Mr. Norton, who read a paper on pneumatic equipment at the Chicago meeting of the S. A. E. last winter, in which he mentioned reduced depreciation of the highways as one of the secondary advantages of pneumatic tires. He believed that Mr. Norton would agree with him when he said that the preservation of the highways was not of secondary but of first importance. In the farming districts of the West, and in the oil fields, it was absolutely necessary to use pneumatic equipment. He recently had occasion to look over a large batch of orders received by a truck manufacturer located in the West, the order amounting to a matter of $1,400,000. Out of this very considerable number of trucks there were only three for which solid tires were specified. All of these trucks were for use in Iowa, Kansas, Nebraska, Oklahoma, and other states in that territory.

It is likely that many of the states in the near future will pass laws prohibiting the use of extra heavy trucks, that is, trucks of 5-ton load capacity and over, when equipped with solid tires. In fact, two of the states already have passed such laws, one of these being Vermont. Jumping tests made with trucks fitted with solid and pneumatic tires respectively, had shown that the impact was two-thirds less with pneumatic tires. It was true that the initial cost of pneumatic equipment was 200 and in some cases 300 per cent greater than solid tire equipment, but the saving in truck depreciation and repairs alone would wipe out the additional initial expense.

One argument that was often advanced against pneumatic equipment for trucks was that at the high engine speed which often was associated with pneumatic equipment, there would be excessive vibration of the whole truck from engine vibration. In his experience, however, this vibration was not a serious factor. The puncturing bugbear had also been brought up, but punctures were the least of their worries, and the same applied to tire blowouts.

The speaker said that a year ago his company received orders for a large number of spare tires from the Post Office for use on the rural free delivery mail trucks. Recently these orders had decreased and he had made an inquiry to find out the reason. He had been told that the Post Office had very largely given up carrying spare tires, as they had found very little need for them. Punctures and blowouts were of very rare occurrence, notwithstanding the fact that rural mail delivery wagons were used over all kinds of roads. A card index was kept by the U. S. Post Office, covering the history of every tire used by this department. The speaker had looked over this card index and had seen card after card showing service records of 15,000 to 20,000 miles. The U. S. Tire Co. had records in its office showing services ranging from 10,000 to 50,000 miles of single tires—"if you do not believe it come up to the office."

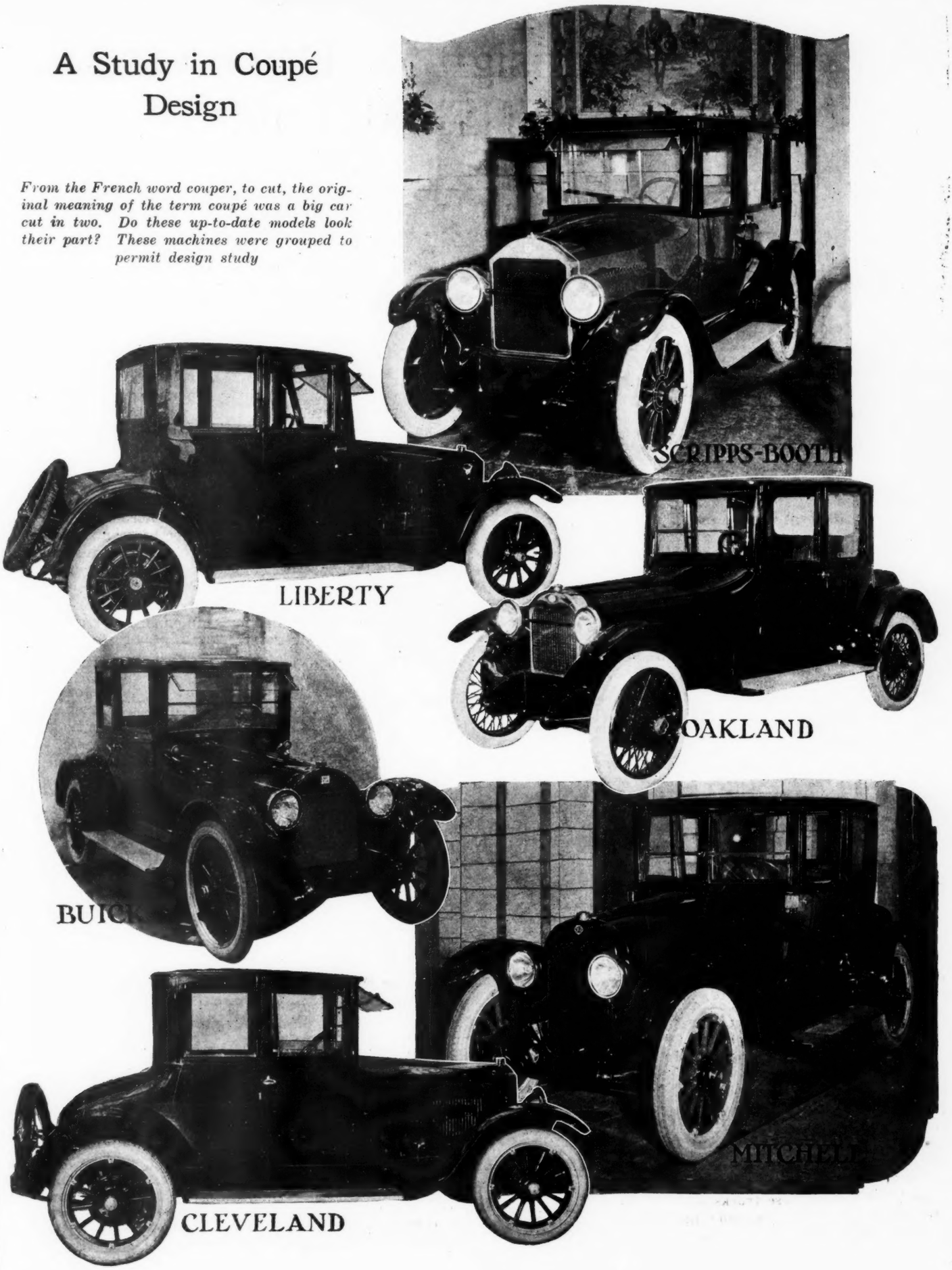
One thing that is going to help the general introduction of pneumatic tires for truck service is the fact that there are 50,000 service stations in the country equipped to render service on pneumatic tires, while the number of stations equipped for solid tire service is limited to 5000.

The speaker also covered the subject of change over from solid to pneumatic tire equipment on trucks already in existence, and said that it was a comparatively easy matter if new wheels were purchased.

At the conclusion of the talk, moving pictures were shown illustrating the manufacture of pneumatic truck tires in a Detroit factory. Mr. Logan said that the cast iron core for a 40 x 8-in. pneumatic truck tire weighed 500 to 600 lb., and the mold for same 2100 lb.

A Study in Coupé Design

From the French word couper, to cut, the original meaning of the term coupé was a big car cut in two. Do these up-to-date models look their part? These machines were grouped to permit design study



Equipment Design for Use on the Pneumatic Tired Truck

The rapid advent of this form of truck has brought with it numerous problems that are clamoring for solution. The makers of engines, gearsets, rear axles, tires and wheels are affected alike by the many factors involved in the necessary conversion. Consequently, Mr. Schipper summarizes them and gives the opinions of engineers and builders to whom he has talked.

By J. Edward Schipper

ALL of the problems concerning the changes in truck design, which might be rendered necessary by the wider adoption of pneumatic tires, will not be solved by the engine manufacturer. Neither will they be taken care of by the manufacturer of transmission gearsets, rear axles, tires or wheels. It is a joint problem which presents plenty of factors for consideration to all. The solution will eventually be found in a well knit design compensating for all of the requirements which are wrapped up in the use of the pneumatic tire.

For analysis, we can consider the truck as having two functions. The first is that of load supporting and second that of propulsion. If we discard for the time being the load supporting factor and concern ourselves with those of motion, as affected by the pneumatic tire, it will lead to some interesting thoughts which must be considered in planning the fully pneumatic tired vehicle. It may or may not be that the total weight of a truck of given capacity can be reduced with pneumatic tires. If so, this will be a gain which is self-evident. If not, the factors of power transmission are not affected, and these may be considered independently for the time being.

Two Schools of Opinion

It has become apparent that we have two widely differing schools of opinion on what the pneumatic tired truck powerplant will be. There are many engineers of high standing who maintain that the higher speeds are bound to prevail with engines of relatively small dimensions and high output. In other words, this school believes that there will be a tendency toward passenger car powerplant practice as far as pneumatic tired trucks are concerned.

The other school is vigorously opposed to this idea, believing that the future engines will not differ materially from the present solid tired truck design, as far as speed is concerned. Engine manufacturers in this school believe that the developments will bring forth a practice of holding down the engine speed, in spite of the increased speed of the vehicle by changing the gear ratios and adopting larger sized engines. In other words, the belief is expressed that practice will dictate conservative engine speeds with higher gear ratios used on the average roads, and a greater series of intermediate gear ratios than are at present used for pulling through soft roads and grades. Manufacturers in this school put the matter up to the transmission and axle builders, stating that the longer intermediate range must be broken up by a greater number of ratios available.

This opinion is not concurred in unanimously by the gearset manufacturers. If a vote were taken by all of the manufacturers, those who foresee a definite future for the four-speed gearset probably would be in the majority, but there is a strong and vigorous minority who do not believe that they should go above three speeds and put the matter back into the hands of the engine makers. One engineer who represents a large transmission manufacturer says on this point: "There might have been an argument in favor of the four-speed gearbox before engines were perfected to their present standard. The only argument I ever considered on a four-speed job was the over-speed, and the present truck engine with its governor takes care of this. I wish to register my opinion in favor of three speeds forward and one reverse."

The Tractor Problem

It does not seem that there is any possibility of solution by either the engine or transmission branches of truck manufacture. Truck makers desire to put out a vehicle with a tractive effort sufficient to take care of the needs of the vehicle on any kind of road, and tractive effort depends directly on the engine torque, the truck ratio and the truck efficiency, and varies inversely as the wheel diameter and the weight of the truck. These are the only factors which we have to deal with, and when we set out to secure a definite tractive effort, we can only secure it by making the values of these factors such that the result will be what is desired.

If we consider that the tractive effort secured with the present solid tired truck is what is desired, and if we fit pneumatics to take care of the job, we have immediately increased the wheel diameter to a large extent, and we must, therefore, increase the engine torque or ratio to take care of this difference. Since the truck is traveling at higher speeds, we must also have the torque delivered at the higher speed sufficient to maintain the tractive effort within the speed range desired. This again comes back to the fact that engine torque must be increased either by the use of engines of different characteristics, or by the use of engines of greater capacities from a displacement standpoint.

Weight Increase

If the displacement standpoint is used, we are naturally putting on a heavier unit and increasing the weight, which again brings us back to the necessity for compensation in either torque or ratio, and consequent loss to pay load. If we can possibly work in the other direction—

of a higher output engine running at higher speeds—it is obviously of advantage to do so, and this is what a very large number of engine manufacturers are attempting to do.

As one prominent manufacturer points out, higher engine speeds mean lighter engine weights per power developed, a factor which reduces tractive resistance as well as gross weight. Some engine makers fear this procedure on account of the lubricating oil limitations, one of them stating: "It is evident that the engine speed cannot be increased beyond the physical properties of the lubricating oil. Furthermore, the higher speed engines will wear themselves out in a great deal shorter time and prove unfit, so you can readily see that it would not be good practice to increase the engine speed to such an extent as to reduce its useful life, but it would be more logical to balance the engine speed with the vehicle speed of the truck, together with the physical properties of the lubricating oil."

Manufacturer's Opinions

To this, a manufacturer, who represents the higher speed engine school, replies: "Smaller engines can run at higher speeds, due to better cooling." Another states that it is impossible to speed the engine to a sufficient degree to reach the limiting point of oil, provided the oil is fed in such quantities as not only positively to maintain the film, but also to carry off a sufficient amount of heat to keep the oil cool and consequently to retain its propor viscosity.

Which of these two schools of engine design will win out remains to be seen. The problem is of the greatest interest to the industry, and will be one of the biggest features in engineering for several months to come. The pneumatic tired truck is coming and it is coming fast. It has already outstripped the efforts of the parts manufacturers and to-day many of the pneumatic tired trucks above 2-ton capacity are pneumatics only so far as the tire equipment is concerned, and will not measure up to the standard that will be apparent two or three years from now.

As we get into the transmission problem and begin to study the matter of available ratios, we become more convinced that, due to the greater speed range and the problem of rapidly accelerating the truck from a standstill to a much higher speed than used on the solid truck, we must have a greater number of ratios. M. P. Fuller, secretary of the Fuller & Sons Mfg. Co., expresses the following view:

The Necessary Gearset

"Pneumatic tired trucks unquestionably will operate at higher speeds, and as the wheel diameters are larger with pneumatic tires, we think the axle ratio will be raised to some degree. Very possibly higher engine speeds also will be necessary. However, as we view the matter, the wheels will be larger, and if the axle ratio is raised it will necessitate lower low gear ratios in order to give the same low gear performance. With this in mind, we are developing our pneumatic transmission. One factor, however, which has worked out, which we did not foresee, is the much better traction obtained by pneumatic tired trucks over the solid. This has materially helped the situation as far as the transmission low gear is concerned, inasmuch as the pneumatic tired truck will not sink into the ground anywhere nearly as rapidly as the solid."

Samuel O. White, chief engineer of the Warner Gear Co., writes: "The combination of a fast top speed with a slow first speed gives such a long range that it would seem almost necessary to have two speeds in between. It is even possible that there may be a demand for more than four forward speeds, particularly in the case of large sized pneumatic trucks." E. P. Reber, general manager of the Cotta Transmission Co., states: "We feel that the demand for four-speed gearsets is here to stay, especially for trucks of 2½ to 5 tons capacity, but it is not so necessary in the smaller ones. Whether the change in design of transmissions is necessary, or lower or higher ratios are necessary, will depend entirely upon what the axle manufacturer does to meet the requirements of speed, etc. It is natural to believe that the reduction will be made in the transmission itself, and the axle designed with a higher ratio in order to give the truck speed without running the engine at excessive speed all the time."

Mr. Reber also states that the tire concerns have taken it upon themselves to recommend tires for various sizes of trucks that many engineers do not entirely favor, as the large tires do not seem entirely necessary and, of course, reduce the driving torque and the power obtained. In other words, the opinion among transmission manufacturers is that four and possibly five or six speeds will be found necessary for the very large pneumatic trucks.

The third member of the group, the axle manufacturer, must, of course, work closely with the transmission manufacturer in order to give the proper ratio at the rear wheels. There is a more or less general feeling that the high reduction type will prevail.

As the problem is analyzed by John Younger, vice-president of the Standard Parts Co., "the effect of the pneumatic tire will be felt mostly on comparatively level roads, or rough surface where decreased road resistance on the pneumatic tire will slightly assist in lowering the engine power necessary to drive the truck at a predetermined speed. On inclines and on smooth surfaces, the power necessary to drive a truck at a predetermined speed will be practically the same. The great benefit, therefore, from pneumatic tires rises from the fact that, by virtue of their decreasing vibration particularly at higher speeds, these higher speeds can be obtained. This increase means that greater power has to be expended.

Needs Joint Solution

"The line of development therefore will be in the direction of special trucks with high powered engines and comparatively high reduction rear axles—say in the neighborhood of 6 to 1. This may be visualized by saying that the 3-ton pneumatic truck will have a 5-ton engine (as used on a solid tire vehicle) on a 2-ton chassis (as on solid tires). Regarding the type of final drive, no change is necessitated."

Summing up the situation and the views of the various parts makers considered, it is very apparent that the entire problem of propulsion of pneumatic tired trucks presents a series of questions which must be solved jointly by engine, transmission and axle manufacturers. No one of these can solve it alone, as requirements are such that a balanced drive must be maintained, and the question of engine torque, transmission and rear axle ratios, wheel size and tractive effort generally is so closely bound together that unity of purpose among all of those concerned is a necessity.

THE secretary-treasurer of the National Association of Credit Men, New York, in a letter to members of that organization, says: "We offer as our conviction that no serious decline in prices can be anticipated in the immediate future. On the contrary, the prices of some commodities are likely to advance further, but the whole burden of effort should be to encourage production of essentials and to prevent them from reaching that price peak from which they must inevitably fall sharply."

Theories and Practices in the Air Cooling of Engines

Part II

The use of aluminum in cylinder construction is gone into thoroughly by Dr. Gibson in this final section of his excellent two-part article. He gives the results of numerous cooling tests on various engines and takes them up from the standpoint of design.

By A. H. Gibson, D.Sc.*

AN air-cooled cylinder with aluminum head is necessarily of composite construction, since the valve seats and the working surface of the cylinder barrel must be of some harder material. Several types of composite construction have been tried with varying degrees of success. The valve seats may consist of rings of steel or of bronze, and these may be either cast or expanded into position. Both methods and both materials have been used with success. Owing to the relatively higher coefficient of expansion of bronze, such seats are less likely to come loose under operating temperatures if expanded in than are steel seats.

One type of composite construction is shown in Fig. 1. Here the aluminum casting forms the head and surrounds the greater portion of the cylinder barrel. The latter consists of a steel liner which is shrunk into the casing at about 300 deg. C. The casing itself is finned, and provides the barrel cooling surface. Several cylinders of this type, with diameters up to 4·75 in., have been tested and have given excellent results. On the other hand, the relatively high coefficient of expansion of the aluminum alloys (0·000024 as compared with 0·000012 for steel) tends to cause separation of the liner and casing at working temperatures, and this causes overheating of the liner and consequent drop in power and increase in fuel consumption. Some few cylinders have developed such trouble, which has always been traced to a badly fitting liner. This drawback becomes proportionately less important as the cylinder diameter is diminished, and for smaller diameters than 4 in. there is little reason to anticipate any difficulty of this kind. A shrinkage allowance of about 1 in 600 on the diameter should be given.

The method of inserting the liner appears to be important, and better results are obtained when the cylinder is heated in hot air to the required temperature than when heated in an oil bath. In the latter case the presence of the film of oil between casing and liner is probably responsible for a certain lack of thermal contact.

Tests on bronze liners have been made, and by this means expansion troubles may readily be overcome. The wear of such a liner is, however, greater than that of a steel liner, though it is probable that investigation may enable a sufficiently hard liner of this type to be developed.

Tests have also been made with screwed-in steel liners, but with unsatisfactory results. Such cylinders have always given very high oil temperatures, indicating a hot liner, and on cutting the cylinder open after operation, lack of satisfactory contact between the liner and the casing has always been evident. The difficulty of obtaining good contact at all points of a long threaded liner is very great, and if satisfactory contact be obtained when cold, the difference of longitudinal expansion when hot causes the threads to touch only at isolated points.

In a third system of composite construction, the aluminum casting has been confined to the cylinder head, and into this has been cast or screwed the steel barrel with its own steel cooling fins as shown in Fig. 2. Mechanically this system has proved sound. The cast-in barrel has been used successfully in sizes up to 6 in. diameter, and the screwed-in barrel in sizes up to 5½ in. diameter. The holding down bolts now grip a ring, integral with the steel barrel. With a screwed-in barrel, the length of the

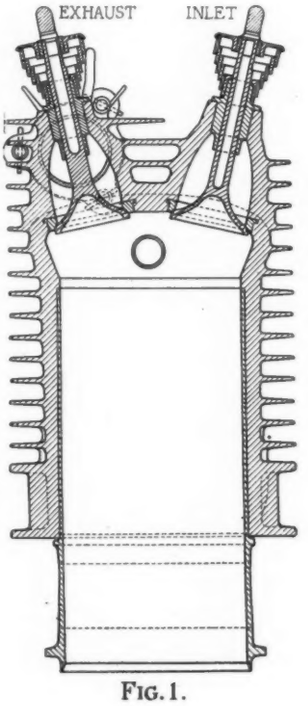


FIG. 1.

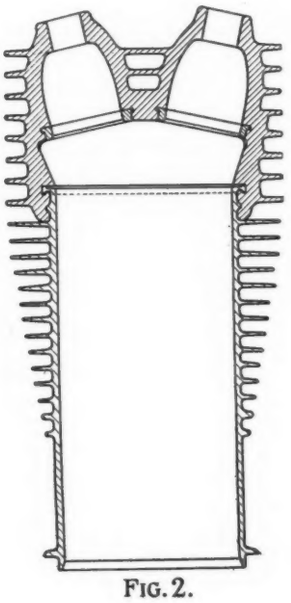


FIG. 2.

*Of University College, Dundee.

Paper read before the Institution of Automotive Engineers of Great Britain. Condensed.

screwed portion should be about one-fourth of the cylinder diameter.

In another system, exemplified in a well-known series of engines, the barrel and head are formed of steel in one piece. An aluminum cap embodying the inlet and exhaust ports is secured to the cylinder head by a series of bolts. This type is intermediate between the aluminum-headed cylinder and the all-steel cylinder.

The author has had the opportunity of carrying out extended tests on the type of all-steel cylinder used in the Clerget, Le Rhone, and other well-known aircraft engines. These tests have been on cylinder diameters ranging from 4 to 6 in. The tests show that for such sizes the all-steel cylinder gives very appreciably higher fuel consumptions than does the aluminum-headed cylinder, and that the brake mean effective pressure is lower. An interesting series of tests has been carried out by the author on a series of three cylinders differing only in the construction of the head. In one case this was of steel, with one aluminum inlet and two cast iron exhaust ports bolted to its outer surface. In the second (Fig. 3), an aluminum cap was fitted to the head of the same cylinder; and in the third (Fig. 4) the original head was cut off and an aluminum head was cast on to the same barrel. The cylinder diameter was 5½ in. by 6½ in. stroke, and the compression ratio 4·6. The tests were carried out at 1450 r.p.m. and in a wind of 82 m.p.h. The results showed that under maximum load conditions the aluminum-headed cylinder gave 15 per cent more power than either the steel cylinder or that with an aluminum cap. The fuel consumption of the aluminum-headed cylinder was 26 per cent less than that of the steel cylinder and 20 per cent less than that of the capped cylinder.

It is true that the cylinder as originally designed was not very well adapted for the application of a cap, and probably appreciably better results could be obtained with this cap forming an integral part of the design. The author's experience, however, tends to show that unless such a cap is well bedded, the cylinder head is but little cooler than with the normal steel head, and that, however well fitted initially, "growth" and distortion of the aluminum cause lack of contact after some hours' running. Unless the cap be then rebedded the power falls off and the fuel consumption increases very appreciably.

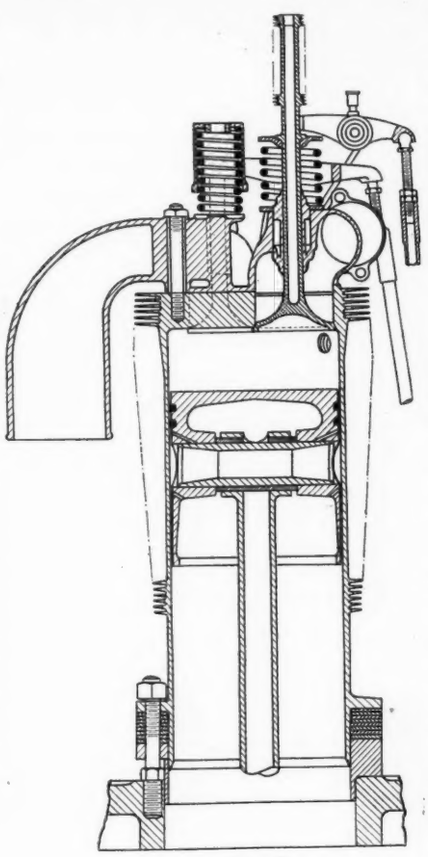


FIG. 5.

The largest all-steel cylinder so far tested by the author and his colleagues has a bore of 6 in. and a stroke of 8 in. With a compression ratio of 4·48 and in a wind of 75 miles per hour this cylinder (Fig. 5) developed 115 lb. brake mean effective pressure on a fuel consumption of 0·68 lb. per b.h.p. hour at 1250 r.p.m. and 105 lb. mean effective pressure on the same consumption at 1600 r.p.m. It had a single water-cooled exhaust valve 2·75 in. in diameter. Under similar conditions an aluminum-headed cylinder of the same size developed 121 lb. brake mean effective pressure on a consumption of 0·56 lb. per b.h.p. per hour.

Cylinders with Longitudinal Fins

The large majority of the air cooled engines tested by the author have had circumferential fins surrounding the barrel and head, and have been tested in a free air blast. Two, however, were of different design, with longitudinal fins down the barrel. One of these was a Franklin car engine, with six cylinders 3⅝ in. (92 mm.) bore by 4 in. stroke. Each cylinder carries a series of fifty-six parallel steel fins 0·064 in. thick, 0·785 in. deep and 8·0 in. long. Each cylinder is surrounded by a cowling closely fitting the fin tips and air is drawn through these cowlings from top to bottom by a fan having a diameter of 20 in. and a width of 4 in. The mean air speed between the fins is 18 m.p.h. with an engine speed of 1200 r.p.m. and 23 m.p.h. with a speed of 1600 r.p.m. The engine has cast iron pistons. Owing to the very small clearance of the pistons in two of the cylinders, namely 0·0020 in. and 0·0025 in., it was found impossible to run this particular engine at full throttle for more than ten minutes at a higher speed than 1200 r.p.m. At any higher speed the pistons in these two cylinders seized. At 1200 r.p.m. the brake horsepower was 26·7; the brake mean effective pressure was 70 lb. per sq. in., and the maximum cylinder temperature 190 deg. C. Over a short run at 1400 r.p.m. the engine developed

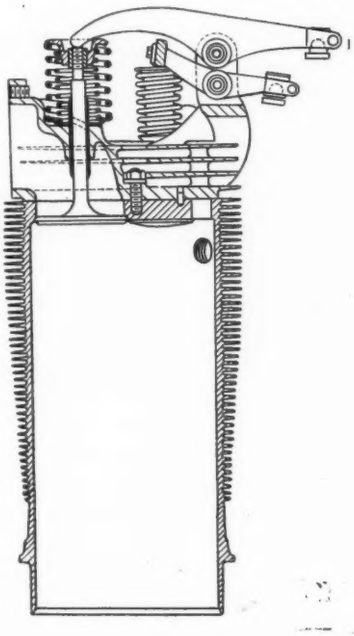


FIG. 3.

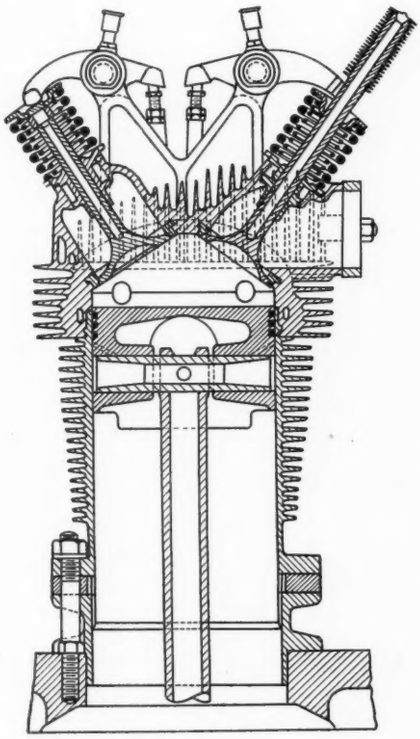


FIG 4

30·3 b.h.p., falling off to 24·9 b.h.p. in ten minutes, when the pistons seized. The maximum temperature half-way through this run was 251 deg. C., the wind speed being 20·5 m.p.h.

In the second cylinder of this type the bore was 110 mm. and the stroke 140 mm. This had a steel liner with an aluminum casing, carrying a series of 100 sheets aluminum fins 0·032 in. thick on the barrel, and thirty-four similar fins on the head. In this case the cooling air was supplied under a pressure of 2·5 in. of water, and passed upward between the fins with a mean velocity of 50 m.p.h. With a compression ratio of 5·2, this cylinder developed 116 lb. brake mean effective pressure on a consumption of 0·49 lb. per b.h.p. per hour at 1800 r.p.m., giving 21·4 b.h.p. The maximum cylinder head temperature was then 261 deg. C. This cylinder had a single inlet and a single exhaust valve, both overhead.

Pistons

Various types of pistons have been used in the different tests. In many cases different pistons have been used in the same cylinder. The results all point to the general advisability of the aluminum alloy piston as compared with one of steel or cast iron. A series of temperatures taken on different pistons in a 100 mm. by 140 mm. aluminum air cooled cylinder, developing 115 lb. brake mean effective pressure at 1800 r.p.m., showed that the temperature of the crown of an aluminum piston of normal design, with a full skirt and with splash lubrication, was about 200 to 250 deg. C., and was 200 deg. C. lower than that of the corresponding cast iron piston. The brake horsepower was 6 per cent greater with the aluminum piston, and the fuel consumption 5 per cent less. The weight of the cast iron piston was 1·77 lb. and that of the aluminum piston 1·26 lb. The maximum clearances (cold) were 0·20 in. for the cast iron piston and 0·26 in. for the aluminum piston. The clearances hot were sensibly the same, namely, about 0·008 in. These pistons are shown in Figs. 6 and 7. The cold clearance necessary over the top lands of an aluminum piston in a well designed air cooled cylinder is about 0·005 in. per inch of cylinder diameter.

Cylinder Distortion

Other things being equal, cylinder distortion will be proportional to the difference of temperature between its hottest and coldest sides. Temperature distortion of the head itself is not usually serious, if the head itself is not of composite construction. One of the objections often raised against air cooling is that an air blast on one side of a cylinder leads to excessive distortion of the barrel. So far as the author's experience goes, this is not necessarily, or, indeed, generally, the case, at least with finned steel or cast iron barrels of reasonable thickness, or with finned aluminum casings fitted with steel or cast iron liners.

In such cylinders the differences of temperature between the two sides of the barrel depend entirely on the way the blast is applied. The exhaust side is normally the hottest, and by applying the blast to this side, the difference of temperature between the two sides may become comparatively small. As an example, the following figures taken from tests on a 5½ in. air cooled aluminum cylinder may be of interest. With the blast on the exhaust side of the cylinder, the maximum difference of temperature between the front and back of the barrel was 58 deg. C., while the mean difference was only 19 deg. C. With the blast on the opposite, the inlet side, the difference of temperature rose to a maximum of 180 deg. C. and a mean of 120 deg. C. In spite of this, however, the cylinder, which

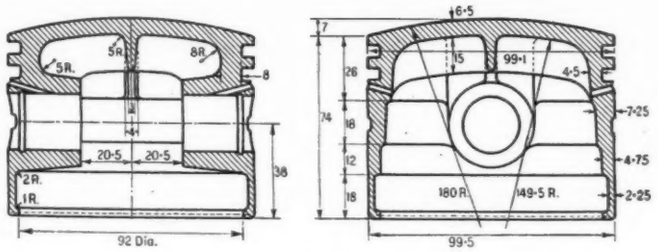


Fig. 6.

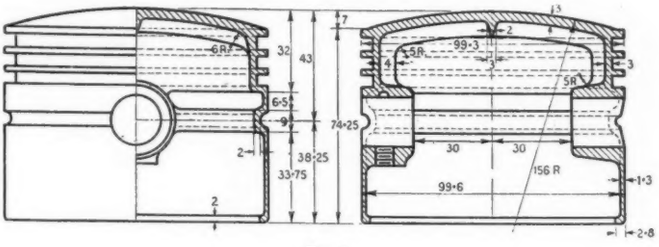


Fig. 7.

was fitted with an aluminum piston having only 0·025 in. clearance, showed no signs of binding after a prolonged run, showing that even in this extreme case and in a cylinder of this size, the distortion was not serious.

The results of a large number of tests on aluminum cylinders of 4 in. bore with the wind impinging on the side of the cylinder midway between the inlet and exhaust valves, show a mean difference of temperature of 56 deg. C. between front and back. Here, again, no evidence of distortion sufficient to have any practical effect has been noticed. A cast iron cylinder of the same design and wall thickness gave a mean difference, under the same conditions, of 63 deg. C., while an L-head cast iron cylinder of more normal design and wall thickness, also having the wind blowing across the cylinder, gave a maximum difference of 75 deg. C. and a mean difference of 68 deg. C. Here, again, the distortion had no apparent effect on the running of the engine. Since temperature differences are smaller with smaller diameters of cylinders, and since the effect of a given temperature difference is smaller as the cylinder barrel becomes stiffer, as will be the case normally in the smaller cylinders, there would appear to be little reason to fear the effects of distortion in any probable air cooled motor car engine.

While a cylinder with longitudinal fins has a comparatively even distribution of air flow around its periphery, this does not necessarily involve a lesser distortion. In the first place, with a cylinder of normal design the exhaust side is always the hottest, so that a cylinder with circumferential fins and a free air blast on its exhaust side will generally have a more uniform barrel temperature than one with longitudinal fins. Furthermore, the stiffening effect of the circumferential fins, of which the outer portions are comparatively cool, is very appreciable, and with a given temperature difference across the barrel the distortion of such a cylinder is much less than that of the cylinder with longitudinal fins.

Fan Cooling

With a fan of the propeller or centrifugal type, the volume of air moved with a free inlet and discharge is sensibly proportional to the speed of rotation. When installed so as to draw or force air through a cowling, the delivery becomes proportional to N^x, where N is the number of r.p.m. and x is approximately 0·85.

For a constant cylinder temperature, the wind speed raised to the power 0·73 or $(N^{0.85})^{0.73} = N^{0.62}$ should be

proportional to the heat to be dissipated. Over the range of speeds throughout which the volumetric efficiency is sensibly constant, and throughout which the brake horsepower and the heat to be dissipated are therefore proportional to speed, the temperature of a fan-cooled engine will increase with its speed of rotation.

Actually the brake mean effective pressure usually remains more or less constant up to about 0·66 of the speed giving maximum power, after which it falls off rapidly, with the result that the total heat to be dissipated at high speeds increases much less rapidly than the speed of the engine.

With a view of determining the effect of this, the author has obtained the values of the heat actually dissipated at different speeds up to the maximum load speed, for a series of engines. Taking the temperature difference between the air and the cylinder at this speed as unity, this difference has been calculated for lower speeds on the assumption that the engine is cooled by a fan of which the output varies as indicated above. The results are given in Table XIII.

TABLE XIII

Engine	Speed, R.P.M.						
	800	1000	1200	1400	1600	1800	2000
Adler L-head. Cyls. 86 mm.x135 mm....	1.02	1.04	1.06	1.07	1.06	1.04	1.00
Adler L-head. Cyls. 90 mm.x125 mm....	1.05	1.02	1.02	1.02	1.01	1.01	1.00
Daimler-Knight Sleeve-valve Cyls. 96 mm.x130 mm....	1.00	1.03	1.03	1.01	1.00	1.00	1.00
Mercedes-Knight Sleeve-valve. Cyls. 100 mm.x130 mm...	0.83	0.87	0.92	0.96	0.98	0.99	1.00
R.A.F. 3 A. Aero. Cyls. 4.5 in.x5.5 in.....	....	0.95	0.97	0.99	1.00	....	....
S. C. Aluminum A. C. Cyls. 4½ in x5½ in.....	....	0.95	0.96	1.00	....	....	....

The figures show that the cylinder temperatures in these engines would only vary slightly with the speed over this range. In the first three, the maximum temperature would be attained at about 1300 r.p.m. and the engine would be actually cooler at higher speeds. In the last three, the maximum temperature would be attained at the highest speeds, but the speed effect is in no case very marked. It follows that the average car engine, if designed to cool when climbing on low gear at maximum engine speed, will be adequately but not excessively cooled under all other conditions, except in so far as it is affected by the cooling wind due to the velocity of the car through the air.

Since the average car engine seldom works at full throttle for more than a few minutes on end, it is a matter for consideration as to whether it may not be possible to cut down the fan capacity so as to allow of temperatures somewhat higher than those desirable under normal conditions to be attained during the worst conditions, as for example, when climbing a long hill on low gear with a following wind. Assuming an air of temperature of 20 deg. C., it may be taken that with a well designed engine, the wind speeds given in Table VIII will enable a maximum cylinder temperature of approximately 240 deg. C. to be maintained. For short periods a maximum temperature of 280 deg. C. is permissible. The corresponding temperature-differences between the cylinder and the air are 220 and 260 deg. C. the ratio being 1·18. Since this temperature-difference is inversely proportional to $V^{0.4}$ it follows that wind speed may be reduced to

$$1/1{\cdot}18^{\frac{1}{0.4}} = 1/1{\cdot}18^{2.5} = 1/1{\cdot}51 = 0{\cdot}66$$

of its normal value, without exceeding this higher limit of temperature-difference. The necessary wind speeds to be given by the fan at normal full engine speed in still air, should therefore be as in Table XIV:

TABLE XIV

Cylinder Diameter, In.	Wind Speed, M.P.H.
2	20
3	25
4	33

It should be noted that these are the speeds necessary when the cylinders are of efficient type, well designed, and with adequate cylinder lubrication; when the engine itself is efficiently exposed to the cooling blast, i.e., when each cylinder is freely exposed; when the blast is directed on to the hottest or exhaust side of the cylinder, and when there is free egress for the heated air.

Allowing a rise in temperature of 15 deg. C. for the cooling air during its passage over the engine, and assuming that 42 B.t.u. are to be dissipated per minute from the engine surface per b.h.p. developed, this necessitates a volume, at atmospheric pressure and at, say, 15 deg. C., of 87 cu. ft. of air per minute per b.h.p.

At a velocity of 30 m.p.h. (44 ft. per sec.) the theoretical horsepower required to produce this cooling blast is only 0·006. The efficiency of these small fans, if well designed, is at least 50 per cent or, allowing for frictional losses in the cowling, say 40 per cent, so that the actual horsepower absorbed in cooling at full speed should not exceed 0·015 horsepower per engine b.h.p.

In an engine with L-head cylinders, the horsepower absorbed would be about 50 per cent greater than this or 2·2 per cent of the engine horsepower, while if the wind speed was doubled, allowing the same rise in temperature, the horsepower absorbed would be quadrupled, since the horsepower of a fan is proportional to the product of the weight of air and the square of its speed.

Some measurements of this fan power were carried out on a R.A.F. 5, twelve-cylinder Vee fan-cooled engine. Here the cylinders are of cast iron and of L-head design. The brake horsepower is 140, the wind speed 60 m.p.h., and the fan, which is of the encased type, absorbs 9·25 horsepower at full speed, or 6·5 per cent of the engine power.

Tests by Riedler on the power absorbed by cooling fan of the propeller type, used in connection with a water cooled stationary tractor engine, gave the following results:—

Fan speed-revolutions.....	710	900	1030	1140	1240
Power absorbed H.P.:.....	0.10	0.20	0.30	0.40	0.50

No figures are given as to the velocity of the cooling air, but at 1240 r.p.m., with a power consumption of 0·5 hp. the heat dissipated from the radiator was the equivalent of 23·7 hp. The mean temperature of the radiator water was 75 deg. C. and the air temperature 16 deg. C. As the mean temperature-difference between the air and the cooling surfaces of the average air cooled cylinder is at least twice as great as in this radiator, even if the efficiency of the cylinder surfaces, owing to their form, is only 75 per cent as great as that of the average radiator (a figure lower than is indicated by experiment) this fan would dissipate the heat from an efficient air cooled engine of 22 hp., absorbing 1·5 per cent of the engine horsepower in the process.

AT an automobile show recently held at Copenhagen, Denmark, in the Tivoli Garden, there were represented 22 American makes of passenger cars, 9 French, 5 German, 4 British, 1 Belgian and 1 Italian.

The Increase of Power Output with Higher Compression Ratios

Another of the McCook Field engine tests. The results of this series show that fuel consumption is decreased as the compression ratio is enlarged. Three sets of pistons were utilized in a standard Liberty engine and the characteristics were determined of high, medium and low compression ratio.

POWER output increases and fuel consumption decreases with increased compression ratios, according to a series of tests made at McCook Field to determine the characteristcs of high, medium and low compression ratios on the power and fuel consumption of an engine. The tests were carried out on a six-cylinder Liberty engine for which three sets of pistons were available. Each of these was designed to fit the standard 5 x 7-in. Liberty cylinder. They are known respectively as the low or navy piston, the standard or army piston and the high compression piston. The illustration, Fig. 1, shows the three types of pistons.

It will be noted that both the navy and high compression pistons are identical with the standard piston from the top ring to the bottom of the skirt, the only difference being in the piston head. The high compression piston has a domed head slightly higher than that of the standard piston. The head of the navy piston is perfectly flat and the compression ratio is, therefore, considerably lower than with the other two types. The pistons are all of the ribless type with heavy side walls. Each is fitted with three concentric cast iron rings and made of cast aluminum alloy. The compression ratios provided by the pistons are for the standard 5.42 to 1, for the high compression 5.86 to 1 and for the navy 4.89 to 1.

The Liberty six-cylinder aviation engine used was built by the Thomas-Morse Aircraft Corp., of Ithaca, N. Y. It was coupled to an electric cradle dynamometer in the usual manner. Two Zenith carbureters and Bethlehem porcelain insulated spark plugs were used.

The following runs for determining the desired values were made: With the standard piston two full power runs, one frictional horsepower and compression pressure run and two propeller load runs. The valves were then re-ground, the navy pistons inserted and the above run repeated. After this the valves were again re-ground and the high compression pistons inserted with the same run being made. The same set of piston rings was used throughout, except in the case of one ring which was replaced due to breakage. This was done in order to keep the piston friction as nearly uniform as possible. Timing and tappet clearances were checked each time the pistons were changed.

The results obtained in these tests are shown in the curves, Figs. 2, 3 and 4. Summed up, the general deductions are tabulated as follows on the opposite page:

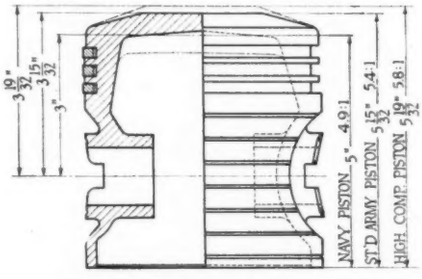


Fig. 1 — Army piston, navy piston and 5.8 to 1 piston, for standard Liberty engines

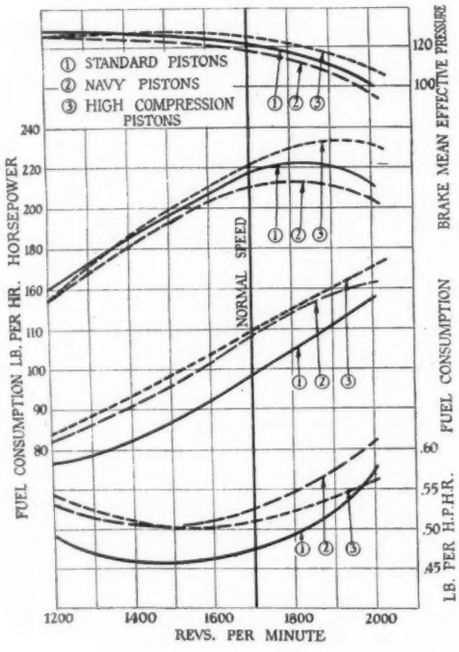


Fig. 2 — Horsepower, brake mean effective pressure and fuel consumption Liberty Six engine with standard, navy and high compression pistons

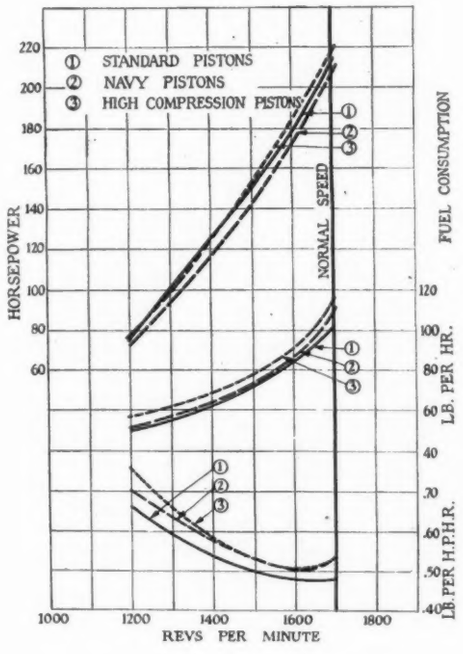


Fig. 3—Horsepower and fuel consumption of Liberty Six engine on propeller load with army, navy and high compression pistons

COMPARISON TABLE.

Pistons and Compression Ratio	B.H.P. at 1,700 R.P.M.	Per Cent of Power Developed with Army Pistons as 100 Per Cent.	Fuel Cons. at 1,700 R.P.M. Lb. H.P.H.	Per Cent Increase in Fuel Cons. Over Army Pistons.
Navy 4.89 :1	210	97.7	0.527	10.9
Army 5.42 :1	215	100.0	0.475	0.0
High Comp. 5.86 :1	220	102.3	0.512	7.8

When equipped with the standard and the navy pistons, the engine ran smoothly and without pre-ignition. With the high compression pistons, the engine vibrated slightly at all speeds and slight pre-ignition was observed at high speeds, but this was not sufficient to cause the power of the engine to drop. It was found that the best setting for all speeds with all three types of pistons was with the carbureter altitude control in the full rich position. All tests, therefore, were run in this way. It will be noted that the air temperatures during the tests of the standard and navy pistons were approximately the same, while that with the high compression pistons was about 20 deg. higher. The curves in Fig. 4 show the friction of the engine to have remained practically the same for all tests.

It is evident from the results of this test that the power increases and the fuel consumption per horsepower tends to decrease with increased compression ratios. The results as plotted in Fig. 2, however, show discrepancies in the fuel consumption curves which are not altogether in accordance with the statement that the fuel consumption decreases with increased compression ratios. The fuel consumption for the army pistons is too low and is not representative when compared with other tests of this same engine. The consumption for the high compression pistons is too high, which may be partially accounted for by the fact that the air temperature was 20 deg. higher during these runs and that pre-ignition was slightly noticeable. It, nevertheless, is believed that in the same engine, when only the compression ratio is changed, the specific fuel consumption will decrease with increased compression ratios, limited, of course, by pre-ignition. This is due to the fact that piston displacement remains constant and, therefore, the suction on the carbureter is the same, thus using the same amount of fuel for unit of time while the power increases.

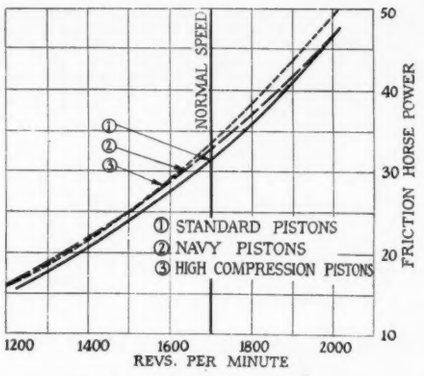
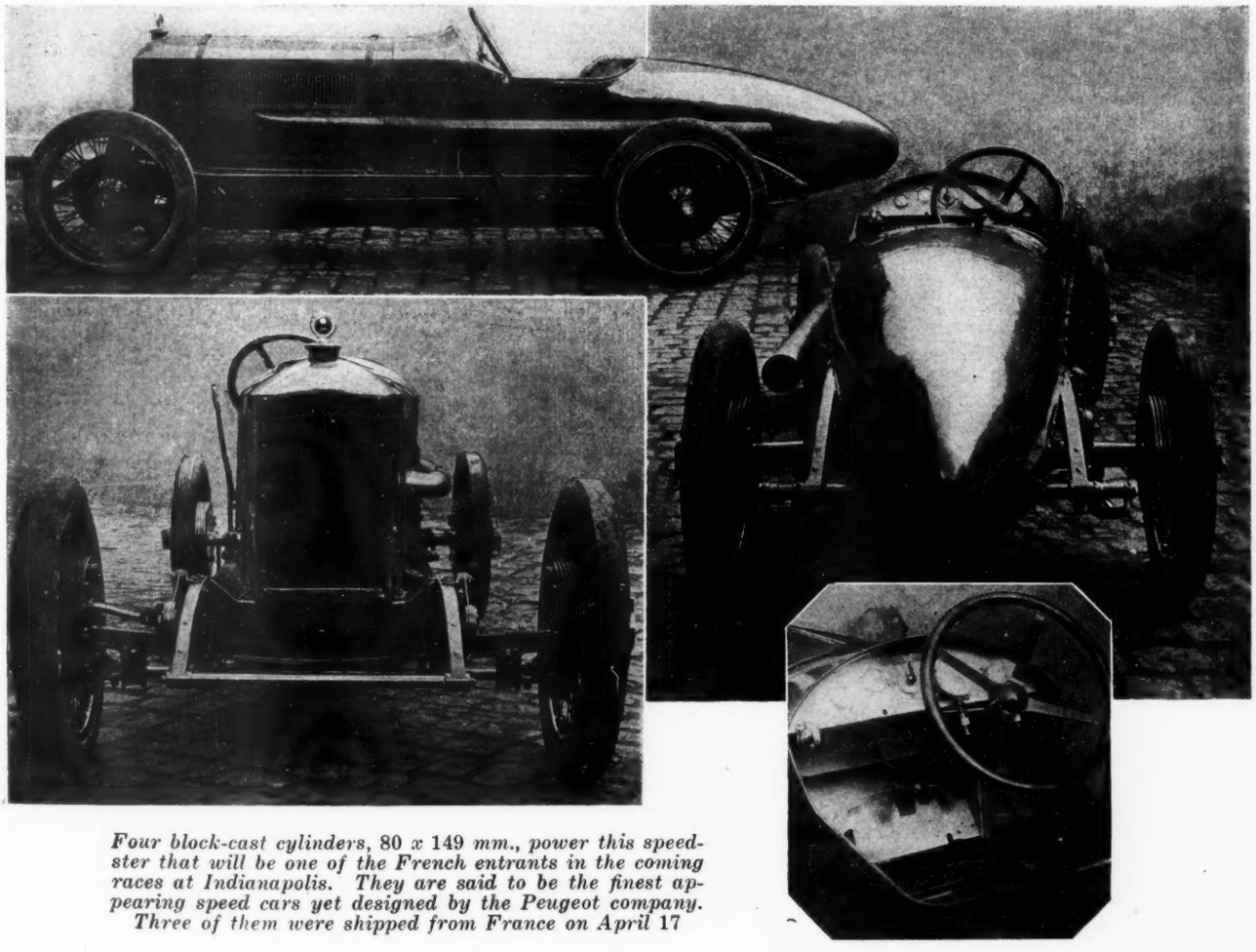


Fig. 4—Friction horsepower comparison of Liberty Six engine with standard, navy and high compression pistons

The 183 Cu. In. Peugeot Racing Cars



Four block-cast cylinders, 80 x 149 mm., power this speedster that will be one of the French entrants in the coming races at Indianapolis. They are said to be the finest appearing speed cars yet designed by the Peugeot company. Three of them were shipped from France on April 17

The Manufacture and Use of Die-Cast Engine Bearings

This brief discussion of a subject that has had but little literature written about it brings up several phases of the making, the utilization and assembly in the engine. It relates the experiences of the Franklin company and describes the practice in force. Mr. Skinner speaks with authority.

By H. C. Skinner*

WHILE every automobile engineer is more or less familiar with the use of die-cast bearings in automobile construction, their early history is known to only a few. When the Franklin company began the manufacture of automobiles in 1902, they first used bronze for their engine bearings. This was found unsatisfactory, as it gripped and scored the crankshaft. At the time, the Franklin company had already been manufacturing die-castings for over ten years, and in solving their bearing troubles they found the die-casting process of vital importance.

Babbitts, as is well known, form some of the best bearing alloys and may be varied to meet demands of the whole range from the low-speed engine for farm use to the high-speed automobile engine. At the same time the low fusing nature of the alloys makes them well suited to die-casting.

Die-cast bearings, as is generally known, are made by forcing molten metal into steel dies which take the place of the usual sand mould and are so accurately made that the bearing comes from the die practically finished, except for any allowance which may be desired for line reaming, scraping or such other finish operation, as may be specified by the designer. Bearing dies may properly be divided into two classes—the solid and the split type. The former are simpler to manufacture but are subject to limitations, as oil grooves must run lengthwise of the bearing and be open at one end at least—preferably the end opposite the flange, in case the bearing is the common type of solid bearing and flanged at one end. Cross or circular oil grooves would result in undercuts which would prevent the drawing of the main core.

A die drawing for two solid bearings of unequal length is shown in Fig. 1. This die is divided into six parts, the upper, center and lower plates, two cores, and a pinion used in ejecting the castings from the die. Plate A is the bottom plate. This is screwed to the lower plate of the die vise, forms one end of the bearing and also locates the main cores. The second plate contains the main cavities which control the outside diameter of the main bearing and the outside diameter and thickness of the flange. Plate C in turn screws on to the upper plate of the die vise and carries the two cores which regulate the length of the oil grooves and inside diameter of the bushing. These are moved forward in ejecting the casting by means of pinion *E* which works in teeth cut in the upper section of the core. In using the die, plate A is fastened to the lower section of the die vise and plates B and C, screwed together, are fastened to the upper section. The two are brought together and the metal is forced in through opening *F* and sheared off with a gate working in same. Then the two sections are separated and cores *D*-1 and *D*-2 are thrust forward by pinion *E*, thereby ejecting the castings from the die.

Fig. 2 shows a die for casting four half bearings at a time. Plate A is the lower plate. On this are fastened

Manager, Franklin Die-Casting Corp.

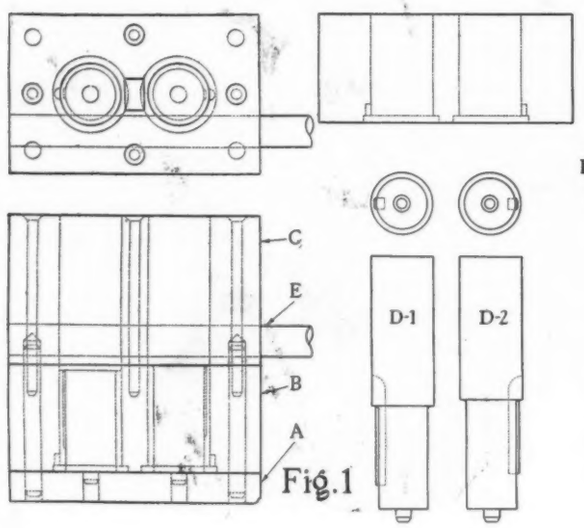


Fig. 1

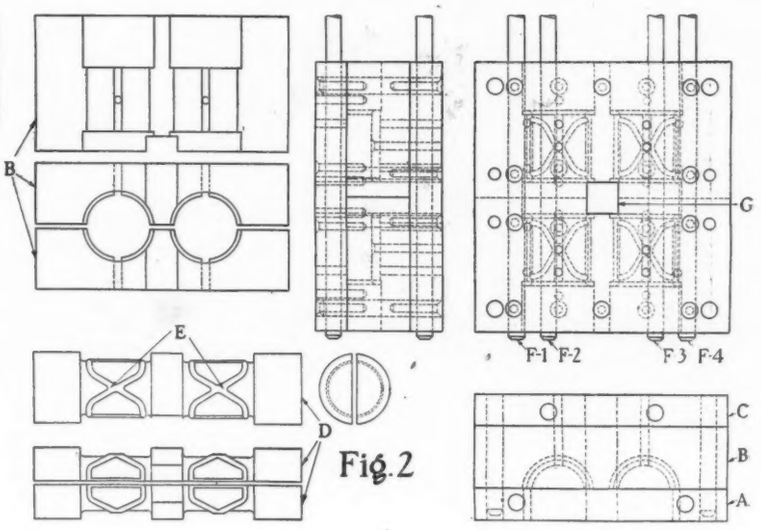
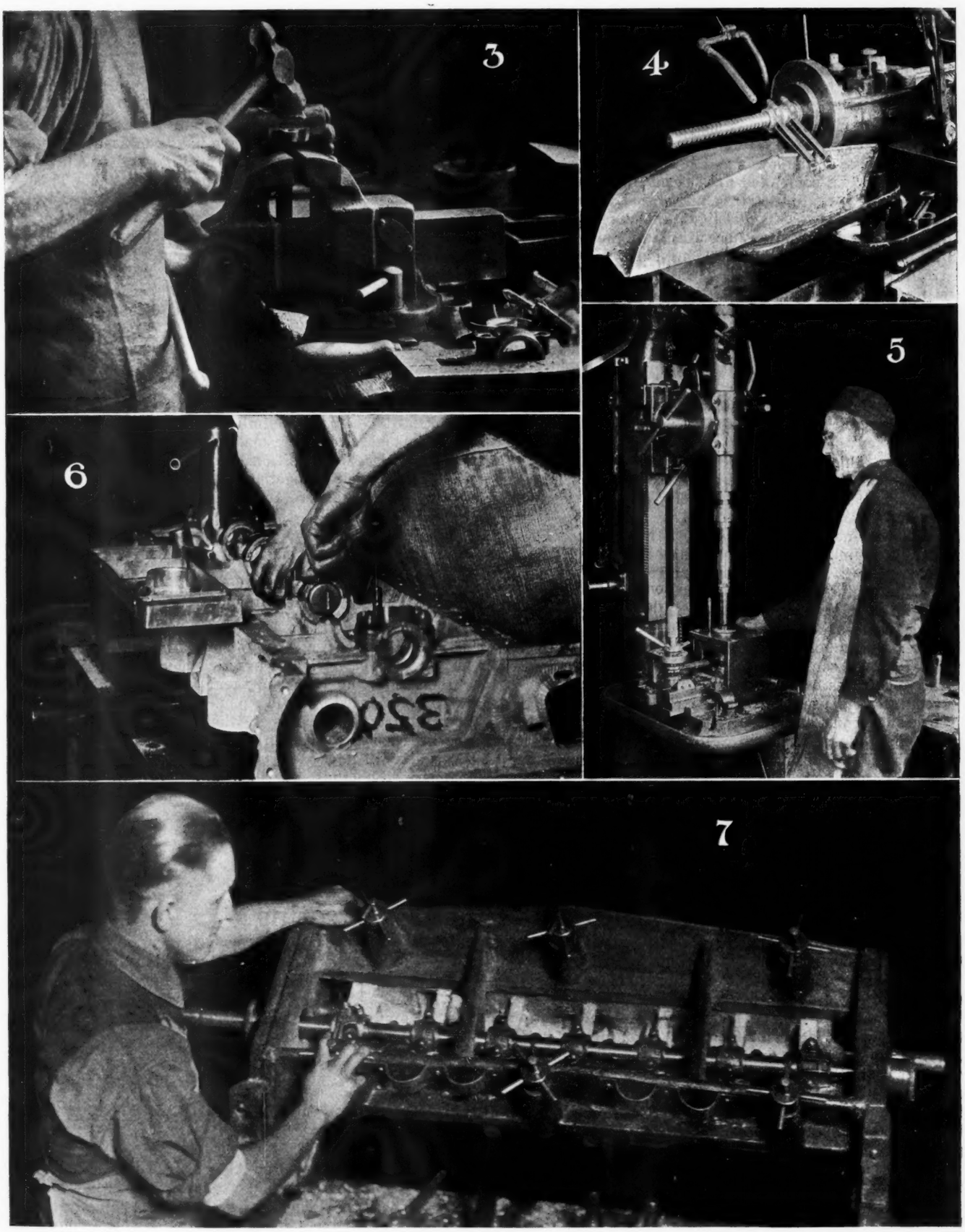


Fig. 2



Operations in fitting Franklin die-cast bearings

cores *D*-1 and *D*-2. These form the ends and inside of the bearing, including the oil grooves. The oil groove cores are either set into the main core or the whole core is formed by milling, leaving the groove cores raised in position. Plates B are fastened to plate C and form the outside surface of the bearing, including the bar raised in this case on the back of the bearing and extending from flange to flange. As the bearing is apt to stick in either side of the die, two sets of ejectors are necessary, pinions *F*-1 and *F*-4 operating the lower and *F*-2 and *F*-3 the upper.

The dies when completed are placed in one of the vises connected with the die-casting machine, and the metal is forced in either by a hand operated plunger or by some form of mechanical power, according to the type of machine used. This process alone, however, will not insure entirely satisfactory results in the engine. Proper die-casting must be coupled with the right metal, the composition of which in most cases has to be determined by the conditions to be met in the engine for which the bearings are intended.

After various tests by Franklin engineers, a babbitt bearing was adopted for the lower end of the connecting rod, replacing the bronze, with instant improvement in results. At first a babbitt consisting of 78½ per cent tin, 13¼ per cent antimony, 4¼ per cent copper and 4 per cent lead was used. This was later replaced by the S. A. E. formula, which, in turn, was replaced by a slight modification consisting of 81½ per cent tin, 13¾ per cent antimony and 4¾ per cent copper.

From the introduction of babbitt, bearing trouble has been almost unknown in the Franklin engine. This has been not only a question of material, but also of design. From the first the Franklin company has religiously adhered to ⅛ in. as the thickness for crankshaft and connecting rod bearings, while other manufacturers had undertaken the use of bearings 3/16 in. or even ¼ in. thick, which required constant taking up, on account of the comparative softness of babbitts, and in time such firms were forced into the use of the more expensive babbitt-lined bronze shell construction. Adherence to the ⅛-in. bearing, coupled with the care exercised in assembling, have given the Franklin company results which have never caused any desire to change to any other forms of construction.

The bearings having been cast, they in time reach the engine assembling division. In assembling the connecting rod bearing to the connecting rod the following course is followed: The babbitt bearing is placed in the connecting rod without additional machining on the outside, as the die-casting process results in a product accurate to dimensions within 0.001 in. plus or minus. On the inside dimensions 0.005 in. is allowed for broaching and burnishing, and 0.001 in. for scraping-in. The bearing is first placed on the rod or cap and pounded down into place as shown in Fig. 3. After the cap has been assembled to the rod it goes to the broaching machine and the broach is pulled through the bearing as shown in Fig. 4. This sets the metal back into place in the rod securely and also sizes the hole for a reamer. In other words, by this process we press the babbitt back into place, close up against the steel, and also compact it, increasing the density of the metal and eliminating any tendency to softness which exists in a babbitt alloy. It is this tendency that has forced so many firms to the use of the babbitt-lined bronze shell construction.

After the bearings have gone through the broaching operation they pass to the burnishing machine shown in Fig. 5. They are then ready for assembling in the motor and require very little scraping-in. In assembling the crankshaft bearings, a similar course is followed. After the crankshaft has been machined in line, the seven bearings are placed in position in both the base and cap, and the two are bolted together. A solid plug is then placed in the bearings and rotated to have the same action as the broach, being pulled through. This is shown in Fig. 6. The operation sets the babbitt back into place, giving the bearing at the same time a hard surface for machining.

The crankcase is now placed in a machine designed for the purpose, bored in line and reamed with the plug that burnishes the hole after reaming. The bearings are ready for the crankshaft to be scraped. With a good job of scraping the bearing usually stands up 30,000 miles without taking up. It is the practice to set these bearings up rather tight and then run them on a block under electric power at a speed of 2000 r.p.m. After running five hours continuously on this block, they are examined but it is not necessary to take up any play, the bearings being a close fit with no looseness whatever.

The method thus described eliminates the necessity for taking up the bearings, which is one of the main items of expense in the assembling of die-castings as practiced by some firms.

International Business Meeting

THE automotive industry will be interested in the first conference of the new International Chamber of Commerce, which meets at Paris on June 21, because of the action that will be taken regarding international trade. This will consist of efforts, through the gathering of business men from all parts of the world, to make export and import trading easier and more safeguarded against unnecessary waste and fraud. The standardization of international documents, practices and laws will be attempted in so far as the conference will possess the power, but, above all, it will seek to promote acquaintanceship between the various countries, thus forming a distinct service in promoting international relations.

The new Chamber of Commerce grew out of the International Trade Conference at Atlantic City last October, which was attended by committeemen from Great Britain, France, Belgium and Italy, as well as the United States. The American staff for the coming meeting at Paris, which already has sailed from this country, is headed by John H. Fahey, a New England publisher, and honorary vice-president of the Chamber of Commerce of the United States. James S. Alexander, president of the National Bank of Commerce of New York, heads the bankers' committee.

Road Development for Dominican Republic

IN a report to the Pan-American Financial Congress the Dominican Republic group reported that financial conditions in the Republic were excellent. It stated that a proper development of the country demands completion of the program for road improvement. Consequently, the negotiations for a loan of $5,000,000, to be secured by first lien on all revenues other than receipts from duties on imports and exports, is justified.

The Sales Significance of the New British Automobile Taxes

Both American and English makers may find this new taxation plan, which becomes effective Jan. 1, 1921, to their detriment. Power presumably will be figured on the old formula involving only the cylinder diameter, the yearly payment being £1 per horsepower.

IT seems highly probable that the average American car as sold in England at the present time will be somewhat under a cloud when the new basis of car taxation, announced by the Chancellor of the Exchequer in his Budget speech, comes into force on Jan. 1 next. This is on the basis of £1 for each horsepower. The car with an engine of low or medium efficiency which is, nevertheless, rated high, according to the British Treasury formula

$$\left(\frac{D^2 N}{2.5}\right.$$ where D = diameter of cylinder in inches and N = number of cylinders) will be at a disadvantage, compared with cars having the small but efficient engines favored by many British makers.

The Ford, for example, is rated at 22.4 hp., and at the new scale of £1 per horsepower (including petrol duty) will be subject to an annual tax of £23 (about $110 at pre-war rate of exchange). Hitherto the tax on this car has been $30, plus 12 cents per gallon duty on gasoline. As the average consumption of fuel in Ford cars used in private service has been about 24 m.p.g. (Imperial gallon) and the annual mileage under 5000, the new scale represents an annual increase of running costs amounting to over $50. The Overland "Four" with its rating at 18.4 hp. will be affected to a lesser degree, though the owner in this case, whose car runs—25 miles to the Imperial gallon—over 5000 miles a year, will have to pay $91 a year as against $54 at present in tax and petrol duty.

On the other hand, British car makers will be handicapped in foreign, especially Colonial, markets. The home demand will still be for a small highly-efficient engine—one that will develop a high power in relation to its cylinder bore and number of cylinders—in order that the tax due upon it may be kept within bounds. But the Colonial buyer, from all reports, does not want this type of engine. He calls for one of medium if not low efficiency, of larger dimensions, and able to keep its lower standard of "tune" without such constant attention as the other type demands.

The British maker, therefore, will be obliged to consider home and overseas requirements as separate and distinct propositions. One model for both will not fulfill all demands; thus the new basis of taxation will discourage quantity production of one type and, as a result, prices will be maintained at a higher level than would otherwise be the case.

The user's main objection to the new taxation is not so much that he is being called upon to provide in this way some $40,000,000 for road improvement and maintenance but that the scheme takes no account of the amount of use to which the roads are put by the individual. Mileage does not count. The man who drives a 30-hp. car will pay no more than he does now, if his mileage exceeds 10,000 yearly; but this class of user could well afford to pay more. The vast majority of British owners, however, cover between 3000 and 4000 miles each year and they will not be able, in a great many cases, to afford to run a car unless they use one subject to a low rate of tax.

The most popular car will be the light four-seater with an engine rated at 10 to 12 hp. The present 10-hp. Humber and 12-hp. Rover fill the bill. They have respectively four-cylinder engines of 65 x 120 mm. (2 9/16 x 4¾ in.) and 75 x 130 mm. (2 15/16 x 5⅛ in.) and are rated at 10.5 and 13.9. The first, therefore, will be subject to a tax of $52.80 and the other to one of $67.20. These types of car have been coming rapidly into favor for several years past and they will unquestionably increase in popularity.

It would seem, therefore, that if American manufacturers are to make a good showing in the British market they will be more than ever dependent upon offering their cars at competitive prices which will compensate users for the higher rate of tax—unless, that is, it is worth their while to consider British requirements in planning their designs.

The used car market for vehicles with large bore engines will suffer greatly, and one hesitates to suggest the value after three or four years' use of a Dodge, for instance, subject to an annual tax of $114; the man who can afford to expend no more than the used value of that car to buy it will hardly be able to pay such an amount as $114 in annual taxation. This is a point which the purchaser of a new car will consider, for even though he may save $400 or $500 in the first cost of the Dodge as compared, for instance, with the Angus Sanderson, and thus be compensated for the higher rate of taxation for several years, this saving will not suffice as a set-off against the greater depreciation in value in the used car market after, say, four years' use.

Commercial motor users seem fairly content with their side of the matter. They had made up their minds to being taxed despite their exemption hitherto, and the fact that they are to pay on unladen weight—from $48 under 12 cwt. (1344 lb.) to $144 exceeding 4 tons (8960 lb.)—irrespective of mileage, will encourage more efficient methods of operating; bigger mileages with full loads on return journeys will be the aim and when better organization to these ends has once been started to meet the cost of the tax, it will increase in efficiency and ultimately bring running costs as a whole below the present standard with no tax to pay.

Further, the commercial vehicle owner has everything to gain by the better roads which should follow the expenditure upon them of the amount raised by this taxation. Private car users will pay the greater proportion of the total and thus put money into the pockets of industrial users by saving the latter much expense arising now from wear and tear caused by bad road surfaces.

Lighting and Equipment Laws of Various States

THE tables herewith give for the benefit of manufacturers the general features of state laws relating to headlights, dimmers, spotlights, turn or stop signals and mirrors for motor vehicles. In a number of states, permanent commissions are appointed to make regulations from time to time, a plan which gives flexibility to the laws and makes possible any needed changes without awaiting the action of legislatures. A few states require high power headlights, but the tendency is toward non-glare illumination. "Headlights visible 200 ft." is an indefinite expression which suggests the need for engineering as well as legal talent in the framing of laws for motor vehicles. In Delaware, an operator who makes an honest effort to conform to the law is not deemed guilty for the first violation.

A nearer approach to uniformity in the motor vehicle laws throughout the country is desirable as is evidenced by their multiplicity shown here.

State	Headlights	Dimmer	Spotlight	Turn or Stop Signal	Mirror
Alabama	Lamps of some form required.	No law.	No law.	Must slow down and sound bell, horn or other device. Local rules apply.	No law.
Arizona	White lights visible a reasonable distance.	No law.	No law.	The full-arm signal shall be used to indicate the direction of turn.	No law.
Arkansas	White lights visible 200 ft. Number 1 in. high on lamp glasses.	No law.	No law.	Local regulations.	No law.
California	Lights 1200 cp. 200 ft. ahead.	Dimming devices must be tested by Supt. of Motor Vehicles.	Under 42 in. high 100 ft. ahead.	Arm or device down to stop; level toward turn; up opposite turn.	Mirror to be used if rear view is obstructed.
Colorado	No law.	Local rules.	Local rules.	Local traffic rules.	No law.
Connecticut	Permit required if over 24 cp. Lights on commercial vehicles of 2 tons and speed under 15 m.p.h., to reveal person 100 ft. ahead. Lights on other motor vehicles to reveal person 200 ft. ahead.	Device to prevent glare required and must be approved by Commissioner.	Use with care. Deflect to 30 ft. ahead.	Must signal.	Use if rear view is obstructed.
Delaware	Lights must be dimmed, covered or deflected to prevent glare. Operators making an honest effort to conform to law shall not be deemed guilty on first infraction.	Some method of dimming or deflecting required.	Dimmed or reflected.	Local traffic rules.	No law.
District of Columbia	Lights must not glare and must be approved by Commissioner.	Some method of dimming required.	Dimmed if used.	Unmistakable signal to be given.	No law.
Florida	Lights visible 200 ft.	If glare, use dimmer 200 ft. from approaching vehicle.	No bright light projected above 4 ft. 200 ft. ahead.	Local traffic rules.	No state law.
Georgia	Must throw strong white light a reasonable distance.	Subject to local rules.	No state law.	Must give due warning and reduce speed at any sharp curve.	No state law.
Idaho	Lights visible 200 ft.	No state law.	No state law.	Local traffic rules.	No state law.
Illinois	Lights non-glare visible 200 ft.	Use at 250 ft. if glare.	Dim at 250 ft. from approaching vehicle.	Must signal.	No state law.
Indiana	To reveal person 150 ft. away.	Light must be diffused or equipped with dimming device controlled by driver.	Deflect to point 50 ft. in front.	Local traffic rules.	No state law.
Iowa	32 cp. or less. To reveal man 75 ft. away.	No light over 4 cp., if equipped with reflector, shall rise above 42 in., 75 ft. or more ahead.	Must not project light to left of road center, nor in eyes. 32 cp. or less.	Must signal.	No state law.
Kansas	Visible 300 ft.	Lights must be shaded, diffused or constructed to turn down.	Must not fall on approaching vehicle.	Arm up 45 deg., left. Arm level, stop. Arm down 45 deg., right.	No law.
Kentucky	To reveal objects 200 ft. Beam less than 42 in. high 75 ft. distant.	Must dim or deflect lights.	Deflect to point 30 ft. in front, except in emergency.	Local traffic rules.	.....
Louisiana	No state law.	No law.	No law.	Local traffic rules.	No law.
Maine	Must not be over 24 cp. Direct or reflected rays must not rise above 42 in. 75 ft. ahead.	Lenses must be frosted, inside, or Fracto or like device can be used.	.....	.....	.....
Maryland	The law effective after June 1, 1920, requires sufficient light for safety.	An approved lens is required, clear glass not being allowed.	No portion of light to left of axis of vehicle and 75 ft. or more ahead shall rise above 42 in.	Local traffic rules.	Mirror required on commercial vehicles if rear view is obstructed.
Massachusetts	Sufficient to disclose person 150 ft. ahead, or 10 ft. each side 10 ft. ahead.	No dazzling rays over 42 in. high, 50 ft. or more ahead.	Rays not over 2 ft. high 30 ft. ahead, except to read signs or in emergency.	Local traffic rules.	Must have mirror if rear view is obstructed.
Michigan	Lights visible at least 200 ft.	Must dim light so that it will not dazzle driver of approaching vehicle.	Subject to headlight restrictions.	Local traffic rules.	No law.
Minnesota	Lights visible 200 ft.	No law.	No law.	Local traffic rules.	No law.
Mississippi	No state law.	No law.	No law.	Local traffic rules.	No law.
Missouri	Lights must be under 36 cp. each, visible 500 ft., and reveal objects 150 ft. ahead. Light must be projected forward and not higher than lamp nor above 42 in. from ground.	Lamp glasses must be ground or etched.	Dirigible lights must be projected downward, and except in emergencies must not be used in towns.	Usual traffic signals are recommended but not enacted into law.	No law.
Montana	Lights visible 200 ft. ahead.	The front lights to have some style of non-glare dimmer.	Lights must not be bright enough to dazzle or confuse.	If turning to left, extend arm full from shoulder for 2 seconds.	No state law.

State	Headlights	Dimmer	Spotlight	Turn or Stop Signal	Mirror
Nebraska	If projected light is over 4 cp., it must not rise above 42 in. in 75 ft.	.....	Must project rays to ground 30 ft. in front.	Subject to local traffic rules.	No state law.
Nevada	Visible within reasonable distance. Must not cast a blinding ray or a beam over 42 in. high.	Dimmer to prevent interference with sight of drivers of approaching vehicles.	Subject to headlight laws.	Local traffic rules.	No state law.
New Hampshire	Visible 200 ft. Projected light of over 4 cp. must not rise above 42 in. in 75 ft.	Dimmer approved by Commissioner must be used when approaching vehicles.	Must project rays to ground within 30 ft. ahead.	Local traffic rules.	No state law.
New Jersey	Dazzling rays must not be above a parallel 4½ ft. from ground.	Do not use unless device is approved by the Department.	Used only for reading intersecting highway signs or house numbers.	Indicate direction of turn.	Must have mirror unless rear-view is clear.
New Mexico	Lights visible reasonable distance.	No state law.	No state law.	Must give plainly visible or audible signal.	No state law.
New York	Must reveal objects 10 ft. to side 10 ft. ahead. No dazzling ray over 42 in. high 75 ft. or more ahead to left of vehicle's axis. Lights not over 24 cp. each.	Must be approved if used. Special devices may be submitted to the Secretary of State upon payment of $50.	Restricted by headlight laws.	Local traffic rules.	Required on commercial vehicles of 1 ton or more outside cities of first and second class.
North Carolina	Reasonable lighting required.	No state law.	No state law.	Local traffic rules.	No state law.
North Dakota	Unlawful to use lights of over 4 cp. with reflectors if rays rise over 42 in. 75 ft. ahead.	.....	Must project rays to ground within 30 ft. ahead.	Local traffic rules.	No state law.
Ohio	Projected light to be adjusted when approaching vehicle within 700 ft., so that rays are not over 42 in. high 200 ft. ahead.	Lights to be dimmed, deflected or controlled.	When approaching vehicle within 700 ft., project rays to ground within 60 ft.	Local traffic rules.	No law.
Oklahoma	Local regulations only.	No state law.	Local regulation.	Subject to local traffic rules.	No law.
Oregon	Lights must be visible 200 ft. ahead.	Lights must be dimmed sufficiently for safety or have central rays deflected to ground 75 ft. ahead.	Vehicles having electric lights and no dimmers shall have spotlight to throw rays to right and downward.	Must signal.	No law.
Pennsylvania	No light over 32 cp. Lights over 4 cp. with reflectors must not project dazzling rays above 42 in. 75 ft. ahead.	Dimmers used when lights are not permanently deflected or diffused. Devices must be approved by State Highway Department.	Spotlights restricted by headlight laws, and must not project rays to left of road center.	Signals regulated by local authorities.	Must have mirror if rear view is obstructed.
Rhode Island	Lights visible 200 ft.	The state law authorizes the State Board of Public Roads to prepare regulations, which are effective upon approval of the Governor and publication in county papers.	No state law.	Local traffic rules.	No law.
South Carolina	No state law.	No state law.	No state law.	Local traffic rules.	No law.
South Dakota	Lights required.	Provision against undue glare.	Spotlight, if used, must project beam to ground within 50 ft. ahead.	Local traffic rules.	No law.
Tennessee	No state law.	No law.	Local regulations only.	No state law.	No law.
Texas	Lights to be visible 500 ft.	Provision must be made against undue glare.	Spotlight, if used, must not interfere with vision of driver of approaching vehicle.	Plainly visible or audible signal shall be given.	No law.
Utah	Lights to reveal person 150 ft. ahead, or 10 ft. to side and 10 ft. ahead.	Lights over 4 cp. having reflectors must be arranged so that rays do not rise above 42 in. 75 ft. ahead.	No spotlight used unless it projects rays to ground within 30 ft. ahead.	Speed to be reduced and warning given when any sharp curve is approached.	No law.
Vermont	Lights to be visible 200 ft. ahead.	Lights over 4 cp. having reflectors must be arranged so that rays do not rise above 42 in. 75 ft. ahead.	Spotlight, if used, must project rays to ground within 30 ft. ahead.	A person shall not turn, stop or back a vehicle without taking reasonable care to avoid injury to others.	Motor trucks must have mirrors of at least 6 in. diam.
Virginia	Bright light to be thrown at least 100 ft. ahead.	No state law.	Bill regulating use defeated in Legislature March 1, 1920.	Local traffic rules.	No law.
Washington	Reveal objects 150 ft. ahead, or 10 ft. to side and 10 ft. ahead. Lights visible 500 ft.	Lights over 4 cp. having reflectors must be adjusted so that rays do not rise above 42 in. in 75 ft.	Spotlight, if used, directed 6 ft. to right and not over 75 ft. ahead.	Local traffic rules.	Every motor truck or auto stage must have suitable mirror.
West Virginia	Non-glaring lights required.	Lenses of lights to be frosted, shaded, colored, or otherwise modified, to prevent undue glare from reflectors.	Spotlight, if used, not to take the place of headlights.	Local traffic rules.	No law.
Wisconsin	Lights sufficient to reveal person 200 ft. ahead.	Adjustment and operation of lights must prevent undue glare.	Subject to dimmer law.	No state law.	No state law.
Wyoming	Lights sufficient for safety.	All motor vehicles shall be equipped with adequate dimming devices.	Spotlights shall not be used except in emergency.	Local traffic rules.	No law.

Definite Analysis Methods Help Solve Labor Difficulties

Theodore Roosevelt once said that "the best defensive is an effective offensive." This principle is being applied by a rubber manufacturing concern in attempting, by careful analysis, to anticipate unrest among employees. Some of the methods in use are described in this article.

By Norman G. Shidle

AN executive who has charge of an important phase of industrial relations work at a large tire plant recently gave a talk to some foremen. He presented a graphic representation of the point of view and the method of approach used by that concern in attempting to reduce labor turnover and ultimately get better production.

According to this explanation, there are three stages in the growth of the weed of industrial discontent. Fig. 1 illustrates graphically its growth. The seed from which the weed grows is misunderstanding between the management and the men. At this stage the matter can be settled by anticipating the appearance of the weed. Thus far the growth is beneath the ground: by anticipation the weed can be killed before it raises its head.

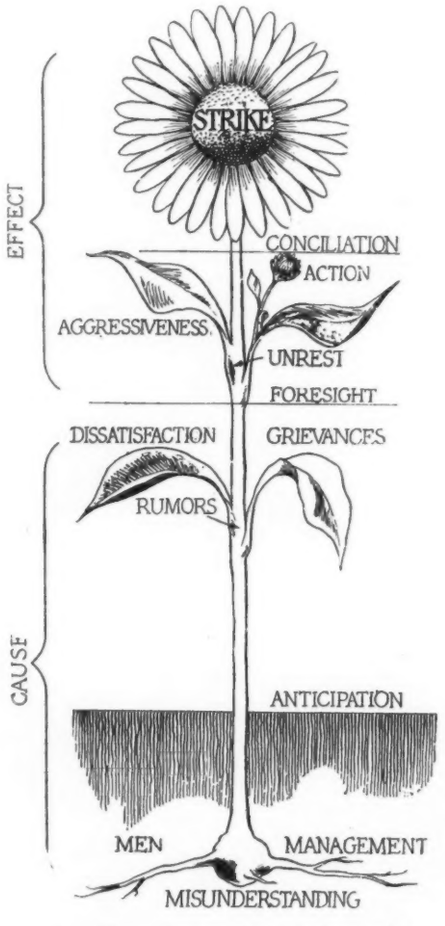
If, however, it is not discovered and it appears above the ground, the second stage of its growth is reached and assumes the form of rumor. False rumors fly about the plant, growing and taking form as they fly. The weed then sprouts off in two directions—grievances and discontent. Even at this stage the matter can be settled by foresight. The weed is above ground; it is easily discovered. Though harder to kill than before, it can be killed by foresight.

Suppose it to pass this stage, however, without hindrance, it grows to the third stage and takes the form of active unrest. The unrest stage gives off the twin branches of aggressiveness and action. When this occurs, there is but one solution—conciliation. That is, the demands of the weed must be granted or a strike will occur. The first two stages may be considered as causes, while the third stage, together with the strike, are effects.

This interpretation of the growth of industrial unrest is manifested in the practical and gradually successful attempts of this firm, the Goodyear Tire & Rubber Co., to bring down its labor turnover and to obtain contented and satisfactory workmen.

Several distinctive features characterize the work along these lines. They have been found of practical value in meeting the situation in a city which presents as difficult a labor situation as any in the country.

One of the chief features is the attempt to see labor conditions in perspective, to find out what has happened elsewhere, and apply the lessons of others' experience to the problems of the Goodyear plant. Whenever a strike occurs in any industry similar either in the nature of product or personnel to that of the Goodyear plant, a thorough study and analysis is made of its causes, both direct and indirect, the conditions surrounding it and leading up to it, the settlement that is made, and the results of that settlement.



1—*How the weed of industrial discontent grows*

This work is conducted by the labor division of the personnel department and is extremely useful in the handling of local personnel work. The causes of discontent in another plant are likely to be identical with the causes of incipient discontent at home. When such causes have been investigated and determined, the next step is to turn the spotlight on the Goodyear plant to see if such conditions are present there. If they are not, well and good; if they are, methods of eliminating them are worked out. Knowing the results of certain settlements of strikes made elsewhere has shown, among other things, that many strikes which appear to have been satisfactorily settled were merely quelled temporarily, the settlement in reality having made new causes of discontent.

A strike or a labor disturbance of any kind, in brief, is regarded by this firm as an opportunity to learn something, as an opportunity to study fundamental causes and, from them, to deduce constructive methods of meeting future troubles. This attitude has been highly successful and is obviously much more useful than that of merely considering a strike or a minor labor trouble as some-

Form 356 Rev-15M-3-3-20—7495

EMPLOYEES PROGRESS RECORD

DEPT. No.

Mail to
MACHINE RECORDS SUB DIVISION 103P

Date Rehired

Employee Hired for

Date Transferred

Card No. Name

Date Hired

Date	P. W. Operation No.	Hours	No. Pieces	Total Paid Learner	Earnings at Regular P. W. Price	Remarks and Suggestions	Date	P. W. Operation No.	Hours	No. Pieces	Total Paid Learner	Earnings at Regular P. W. Price	Remarks and Suggestions

2—Form used to trace progress of employee

thing to be damned and passed over with as little notice as possible.

In analyzing the troubles of others and in devising remedies for similar conditions within the individual plant, there is one fundamental principle which must be the essence of every adjustment. The head of the labor section put it in this way: "In seeking and applying remedies for local conditions, we must always be absolutely on the square with the men. The slightest taint of dishonesty or unfairness on our part would merely eliminate the possibility of success in our work. Every adjustment must be made with the benefit of the worker, as well as of the company, in mind. There isn't much difference, since when the worker is benefited, the company is bound to benefit in the long run. This has been proved by our experience—but it is by no means a generally accepted fact."

A definite effort is made to keep in touch with the new workman, as well as to see that older workmen gain recognition for good services. By doing this, the worker is impressed with the fact that the company is interested in him as an individual and that he is not merely a number on the pay-roll.

The day worker especially must be urged to his fullest capacity, since he lacks the incentive of increased pay for increased work which serves to encourage the piece-worker to produce to the utmost. To supply this incentive a merit system has been worked out. This system is handled by the efficiency department in conjunction with the foremen of the various departments. A man is graded on the following points:

1. Efficiency
2. Workmanship
3. Conduct
4. Attendance

In the normal course of events, a day worker has his pay raised after he has been at work a certain length of time. When that time comes the merit system enables the efficiency department to determine whether or not the man shall get the raise. If his record is satisfactory he gets it. If not, a member of the labor department staff goes to the man and interviews him. This representative simply talks things over, tries to find out the reasons for the employee's poor record, and encourages the latter to better it at once so that the raise may be given. The merit system operates for all day workers as long as they remain with the company, so that the unsolicited periodic raises in pay—when length of service is combined with increased efficiency and value to the company—gives a real incentive to do good work. The fact that someone comes around for a friendly chat when he has failed to achieve the standard necessary to obtain the raise makes the worker feel that the management is really interested in his progress.

Used with somewhat the same object, but in a slightly different field, is the "Employees' Progress Record," which is handled by the labor division. Fig. 2 illustrates the form used to keep this record. The idea is to check up on the progress of a piece worker from time to time, especially while he is new to the plant and the work. The card will show whether or not the worker reaches the average production output within a reasonable time. If he does not, the labor department takes steps to ascertain the reasons for his failure. Often it is found that the man is not well adapted for the particular job and the company increases its productive efficiency by changing him to a task he can better perform.

The matter of individual grievance is considered as being important. Two practices are followed:

1. See that grievances do not arise. Regular methods of adjusting rates, without waiting for a kick from the man, aid in this, while the analysis of troubles in other plants plays a very important part.
2. Adjust those grievances which do arise.

In carrying out this second phase of the work, special attention is given to convincing the man that he has had a just hearing. Every grievance is heard by a member of the labor division staff. He immediately investigates the matter and adjusts it one way or the other. The man is then informed of the adjustment at the earliest possible moment; he is never allowed to feel that his complaint is simply heard automatically and then allowed to become lost in administrative red tape. Grievances are not only heard, but acted upon promptly.

Much has been written about the extensive activities which have been organized at the Goodyear plant for the benefit of employees. A new club house for the men has just been opened, athletics of all sorts are conducted, an industrial university with 5700 men enrolled is operated and a theater, a huge gymnasium and many other features are included in the list. All this, undoubtedly, has a definite effect upon the morale and upon the quality of workmanship, but the labor division is emphatic upon one point "Welfare" work is effective only as it is superimposed upon other things of a more fundamental nature. Good wages, good working conditions, and fair treatment in all matters relating to the actual job mean more to the workman than such activities. Given these fundamentals, however, social and athletic activities organized by and for employees have a definitely beneficial value to the company as well as to the workman.

J. R. Sedgwick, head of the Goodyear labor research

department, stated rather strikingly to AUTOMOTIVE INDUSTRIES the present condition of labor work in general. His opinion may be paraphrased as follows:

"The labor situation to-day is in the same state as was the sales situation twenty years ago. At that time the salesman went out and talked price almost exclusively. 'We can give it to you cheaper than anybody else,' was his chief argument. Any other appeals were presented in a half-hearted way without conviction behind them because the price argument was the only one on which the salesmen and the management were themselves 'sold.'

"To-day a different condition prevails. The salesman talks with conviction not only price, but also quality and service. He does not sell his goods alone on the price but on the service that will go with the article as well. He has learned during these twenty years that there are many things more important than mere price.

"The labor division is a comparatively new development; even the idea of the labor department is new. That department is where the sales department was twenty years ago. At present it too often talks nothing but price. Many managements are convinced that no other argument is practical; that to think of talking anything but price is little more than theory.

"The labor department, or what amounts to the same thing, those who are supplying the ideas which determine the methods of dealing with labor, must begin to talk service in a convincing manner. They must do this, not as a trick or device, but as the only really sound method of development open in personnel work.

"To do this requires a great deal of careful study and investigation and some hard thinking afterward. It is difficult to obtain men competent to work in this department. The development will be gradual but there is nothing to stop us from getting on the right road. That is the basis of the work at Goodyear, which is gradually becoming more and more successful in reducing labor turnover and in making the men strong for Goodyear."

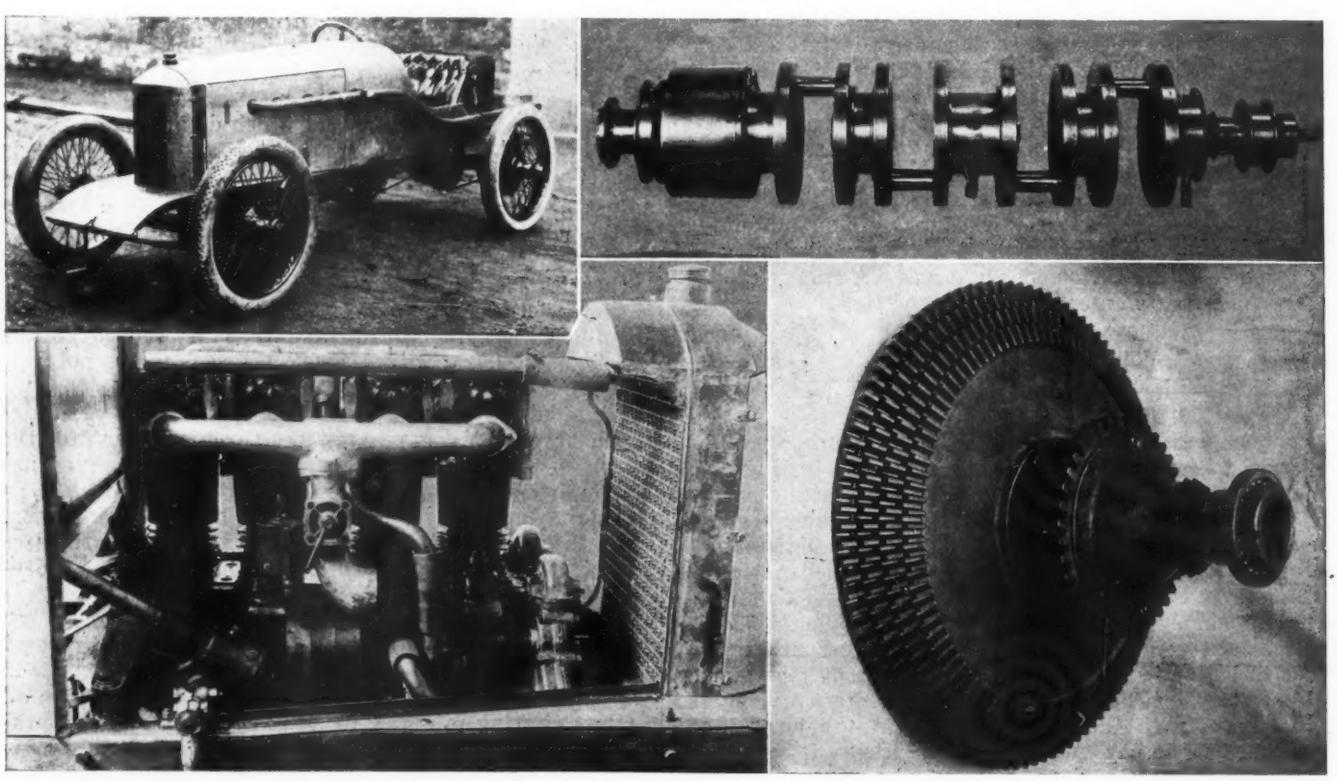
Porporato's New Indianapolis Racer

PARIS, April 23.

JEAN PORPORATO shipped to-day the first of the two cars he has built for the Indianapolis race. Owing to the unsatisfactory railroad conditions prevailing in France, the car was sent to Havre on an automobile truck and was immediately transferred to the steamer sailing a few hours later for New York. Porporato has a second car in preparation but this will not be shipped for about ten days. It will be driven by Jack E. Scales, an Englishman who, until recently, was a member of the Fiat racing team. Scales drove a Fiat in the last French Grand Prix race at Lyons, just before the war.

The two Porporato cars are special jobs built in the experimental department of a French concern, according to the designs of one of the leading French engineers specializing in racing engines. The cylinders are separate castings of 75 x 156 mm., with four valves mounted horizontally and operated by two camshafts in the base chamber.

One of the features is four direct drives with pinions constantly in mesh. The efficiency is the same whatever the drive used. The rear axle mechanism is lubricated under pressure by an oil pump. English-made Rudge-Whitworth wire wheels are used, with English Palmer cord tires.



Upper left—Porporato 3-litre car that will race at Indianapolis. Lower left—Carbureter and magneto side of Porporato 183 cu. in. Indianapolis racer. Lower right—Crown wheel in BND steel giving four direct drives. The pump operating pinion will be noticed. Upper right—Built-up ball-bearing balanced crankshaft

Choosing an Outlet for the Automotive Export Trade

The American maker who overcomes the economic difficulties of present-day production and places his product upon sale in the foreign field should do so upon a basis that will mean continuing and profitable business through the years to come. This article reveals a few of the pitfalls.

THE American automotive exporter, or the maker who contemplates entry into the fascinating and profitable field of foreign trade, has almost the civilized world from which to choose his market. Demands are large, competition from other countries is no more than a vague threat and anxious dealers are asking for automobiles to fill their showrooms and to sell to their equally clamorous customers.

The present desire for cars is apparent and, likewise, it is real. Day after day American firms are offered the opportunity of making this or that connection in this or that country of the civilized globe. Requests for American cars have mounted to such volume that the better known and more firmly established companies have numerous calls from importers who come to New York, Detroit and Cleveland in the hope of buying either cars or the parts to assemble a chassis for sale in some foreign country. The Bureau of Foreign and Domestic Commerce, the National Automobile Chamber of Commerce and other industrial organizations are continually receiving requests from dealers, brokers and salesmen for information that may lead to the purchase of cars for export.

This trend of the export market, considering it only for the present, has been present for months and, seemingly, will continue for yet more months. The world is in need of automobiles and it is asking America to supply them.

But, just as the outlet is large, likewise, the possibilities of mistakes and financial difficulties are large. The temptations to indulge in this trading are numerous and many firms and sales agencies are in danger of being drawn into the whirlpools of this apparently profitable but nevertheless undesirable business. A mistake in choosing a dealer, an unstudied or improper move in connection with a worth-while account, or a failure in living up to the tenets of good business—actions easily possible in such a market—and harm will result to the exporting firm and to the entire industry, perhaps, that only years of expensive effort will rectify.

In this regard the following letter, which needs no comment, sheds a guiding light. It was written only a few weeks ago in London by an English automotive importer, who has handled the distribution of many American cars in Great Britain and who is in a position to know thoroughly the facts of which he speaks. It is reproduced by AUTOMOTIVE INDUSTRIES as revealing and seeking to overcome some of the most pernicious practices that could enter into foreign trading. The letter follows:

> You would be doing the industry a good turn if you could put forward a few words of caution against the present habit of placing foreign agencies in an indiscriminate manner without preliminary inquiry as to whether the proposed agent knows anything about the business or not.
>
> There certainly is some very bad representation over here. American cars are not able to stand in the position which they should. A very large number of firms have been granted sole concessions and their first move has been to close contracts with over-anxious dealers and collect large sums as deposits.
>
> In two cases the people have absconded with this money and it is claimed by the dealers' association that over £10,000 of dealers' money had been lost by being put out as deposits on American cars which are not likely to appear.
>
> I admit that at first sight this sounds like undue credulity on the part of the dealers, but you must remember the condition of the market here last winter and during the past months when there have been a dozen buyers for every car and when, on the British side, there has simply been failure after failure to fulfill even the simplest promise of delivery. In other words, the dealers were absolutely up against it to get cars from somewhere to fulfill their definite commitments to customers, and that was why they fell to some of these con men from your side.
>
> Another bad custom is the giving of options on agencies. For example, there was an advertisement in "The Times" the other day, saying that the sole concession for the finest petrol truck in the world was available immediately, etc., etc. I answered the advertisement out of curiosity, and in due course interviewed the advertiser who proved to be a merchant in a small office in the city, with no apparent connection of any sort with the automobile business. This man showed documents purporting to give him the option for thirty days on the —— Agency. Apart from the fact that there are several years' supplies of —— trucks here—surplus army stock, which the markets are slow to absorb—and apart also from the fact that the —— price is already too high for this market, there was the additional trouble that this man wanted 10 per cent commission, which simply meant handing the option letter across the table without apparently a cent for any obligations or expense on his part.
>
> It looks to me very much as if some of your foreign representatives, particularly from the less experienced companies, come over here and are willing to hand out anything to the first man that they share a cocktail with, with the result that some agencies have passed through three separate hands before they reach the person who is handling it at present.

Another objection is the fact that cars are shipped over here without any parts. Surely it should be evident to any manufacturer that his own reputation demands a shipment of parts with or prior to the first shipment of the cars. Indeed, if I were a manufacturer and found that through oversight parts orders had not been made in advance, I would take a chance of sending a small shipment to England, even if it were necessary to withhold further supplies until the agent or importer had fulfilled his obligation on these parts.

To-day one hears on every side the story of these new American cars being here without even a spare sparking plug (if this happens to be a special type), or a spare valve or anything else.

The general trouble to which I have referred above has two great disadvantages. First of all it tends to spoil the business of those firms who are trying to conduct matters on sound business lines, since they share in the general odium attached to all these new products, and secondly it is bad for the American reputation, for it revives the old idea of American products being dumped here and of American sharp practices, which you will remember, used to exist years ago, and which prior to the war had died down.

A similar warning regarding the Far East was issued late in April by the American Chamber of Commerce in London, which advised that American car makers "be more careful about the agency arrangements" they make for that territory. This statement follows:

> American automobile manufacturers are reported in some cases to have appointed sole agents in foreign territories without taking proper precautions to see that their interests do not suffer. In this way firms are said to have secured sole agencies for very large territories without having to enter into an agreement as to the appointment of special agents, terms of special agency, etc.
>
> An instance is cited where a local company was anxious to push a particular make of American car. The terms quoted by the sole agents left only 12 per cent profit and, out of this profit the company was supposed to appoint special agents in its own region. It was represented in this case that the sole agent was probably retaining a very much larger share of the profits than he should have and was thereby really handicapping the sale and the distribution of the car.
>
> The American Chamber in London cannot take responsibility for these reports, but it feels that American motor car manufacturers will be interested in them if only to make doubly sure that their agency arrangements are being properly handled.

The economic losses resulting from such unfortunate dealings as are related in the foregoing may have been comparatively trivial in comparison to the total volume of the British and the Far Eastern car and truck trade. But they are to be decried and combated in every way possible. Foreign salesmanship, despite any unusual features that may pertain to it, should be founded on the same rules of business that apply at home.

The industrial situation in the United States to-day is such that every exporter should prune away all the superfluities not only in his domestic but as well in his foreign business. The difficulties of finance, the lack of raw materials, the shortage of labor and the great lack of railroad transportation from factory to ship's side and from the foreign port to the dealer and consumer mean that the maker's every industrial action should redound to his future credit.

Immediate profits may be taken by even the most obtuse; the intelligent exporter is the one who can link up future business, paving the way for the years to come when competition will be keener and demand more exacting, even as he cashes in on the dividends of the moment. It is a business loss of infinite harm if the maker, having broken through the economic and transportation difficulties confronting him and placed his car on sale in Brussels, Wellington, or Shanghai, should find that all his troubles have netted him no more than the profits on the few cars he has been able to deliver and provide nothing of future good will.

IT takes a large knowledge of foreign conditions and years of experience to perfect foreign merchandizing methods. We are still, generally speaking, in the position of beginners, in spite of the exceptional ability of some of our large established firms. Within the past few years a considerable number of firms without previous experience in foreign trade have taken serious steps to enter this field. What will pay the best dividends for the future is careful attention at present to the study of foreign merchandising methods.— *From the address of Philip B. Kennedy, director of the Bureau of Foreign and Domestic Commerce, at the recent meeting of the Chamber of Commerce of the United States at Atlantic City.*

If he has picked a poor dealer; if he has antagonized the potential consumers of that foreign market by neglecting to provide parts replacements, service; if he has added troubles to his representatives through improper invoices, improper billing or improper entry, or if he has driven away trade through mistakes in advertising or similar business processes, then he has done nothing more than place a few "easy dollars" into his own pocket and cut off, perhaps, many more that in later days might be his. Such methods have not built up business, rather they have thrown it away.

The sudden expansion of the world automotive trade of the American makers has been such that many mistakes have been made. Enlarging by leaps and bounds, the volume of these "growing pains" has been, perhaps, tremendous, but they may be avoided and the exporter may build himself an attractive and durable market.

The experiences of one car manufacturer may reveal this in an interesting manner. The company, not one of the largest but nevertheless one that is well known, determined last year that it might allot a certain number of machines for export sale. In excess of 1,000, the number was not large, as some concerns reckon their trade allotments. A certain definite number, no more and no less, was set off for foreign sales.

Two salesmen were given the job of disposing of them. One of the men was sent to South America and the second to Europe. Their instructions were definite but broad. No dealer was to be chosen who would not sell 50 cars and each dealer must have the same qualities of salesmanship, ability and determination that would be required for a similar representative in the United States. The factory man himself was to choose the cities in which these dealers—the allotment, of course, limited their number—were to be chosen. Population fig-

ures were not to determine the location of these cities; this determination was to be based upon such factors as the potential demand of each place and its sphere of trade influence in the surrounding territory.

This business was, of course, an experiment. The firm was making its initial entry into the foreign field. But the results were all that could be hoped. The dealers selected were strong ones and the average number of cars taken by each was about 70. Credit was established to the satisfaction of the home office, the connections as finally worked out are satisfactory and the dealings with these foreign representatives are to-day upon practically the same basis as those with a dealer in the United States. Summed up, the company has crossed the boundary limits of the United States with its domestic sales policy.

Entry into a foreign field must first be cautious and then it may expand to suit the demand and the firmness of the foundation upon which it stands. As an instance, one American firm has nineteen agencies in almost as many cities and towns in the little country of Belgium. Another American firm has six, another has five and others have three, two or only one in the same district. Local conditions, the car itself, the Belgian demand and the foresight of the manufacturing companies have each been a contributing factor in determining the number and scope of these agencies.

Instances such as are enumerated here could be enlarged upon to any length. They are as numerous as the automotive exports of America are widespread throughout the world. But they all relate to and bear upon the same declaration—

The industrial condition of the United States and of the world demands that export trade be conducted upon the best lines of business ability and economy of operation.

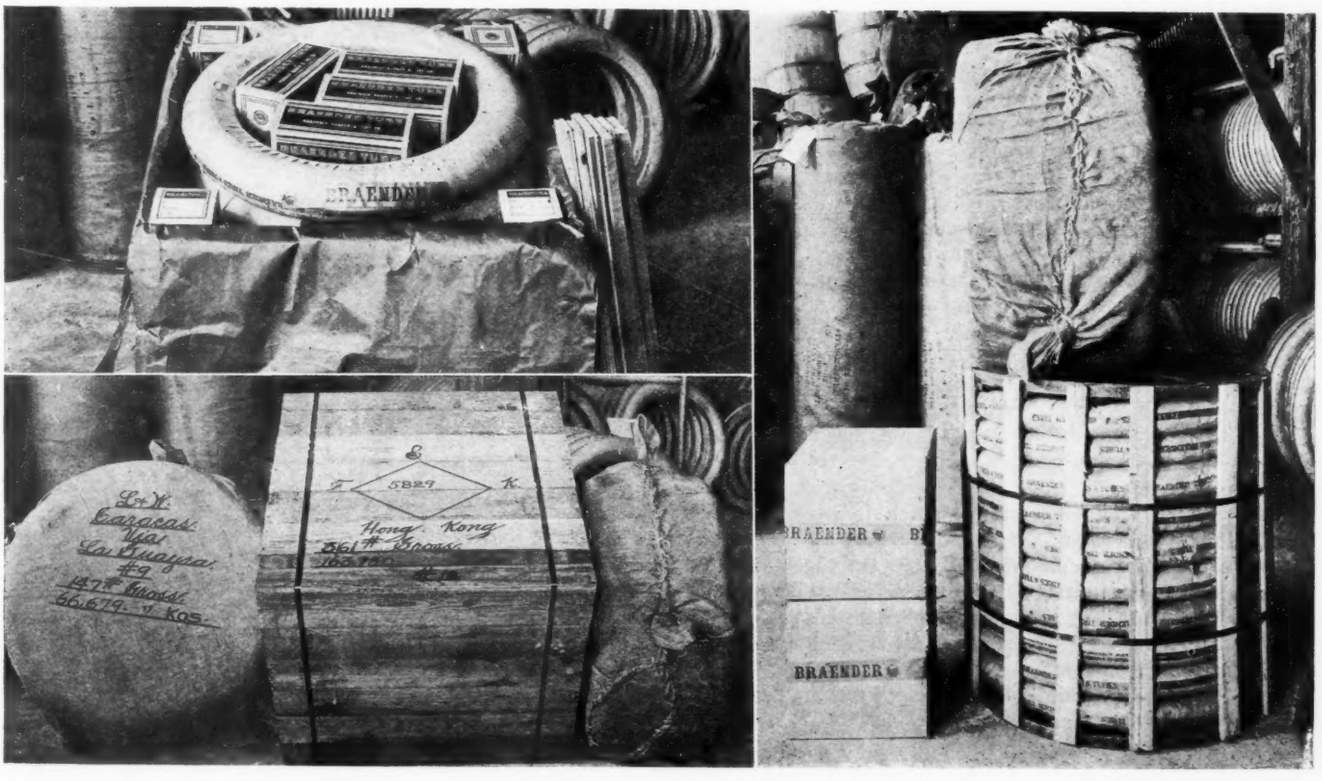
Trucks and Tractors in Jugoslavia

POOR roads with heavy grades make Serbia a poor market for motor trucks. That statement was made in a recent report of Consul K. S. Patton, of Belgrade, Serbia, to the Department of Foreign and Domestic Commerce. The field for the sale of automotive agricultural machinery also was said to be small, as more than half of the farms are less than 13 acres in area, 82 per cent are less than 25 acres and 96 per cent are less than 50 acres. Mr. Patton declares there are no tractors in the district now.

Modern farming machinery, however, might well be used in Croatia and the Banat, the report states, where the country is flat and rolling. But there seems to be little ready cash available for purchasing such machinery and the rate of exchange with the United States was almost prohibitive at the time the report was written.

The Bureau has prepared a list of possible representatives for selling farm machinery and motor vehicles. Copies may be obtained by reference to the Bureau file No. 5890a.

Successful Packing for Export



Packing is one of the big problems of the exporter, even the older companies having their troubles with goods wasted en route. A successful exporter who has had much success in getting his goods to foreign destinations in good condition has given consent that these pictures be printed. The ears on the burlap packages are by design serving as handles

A Suggestion for the Simplification of Hub Standardization

Editor AUTOMOTIVE INDUSTRIES:

I HAVE read with much interest Mr. Schipper's articles on hub standardization which appeared in your issues of April 1 and 29. There is no doubt but that he has attacked a very important problem, and that if in any considerable measure a standardization can be effected it will be of great importance to the industry.

In the article of April 29, I note that Mr. Schipper narrows down the field, for the time being, to motor truck hubs on axles used in connection with pneumatic tires. I have been studying this problem for some time back and would suggest that a start might be still more easily made if axle, wheel and bearing manufacturers devoted their attention first to the front axle situation only, for motor trucks equipped with pneumatic tires.

During the past three months I have been corresponding with axle and wheel manufacturers and have visited a large majority of the axle builders in connection with this subject. I sent out forms which were filled in by practically all the axle builders, giving essential hub dimensions in connection with their axle recommendations for certain size trucks. I enclose blueprints of the tabulations for both front and rear axles, from which you will see how a wide variation exists in this field.

After studying these tabulations I drew up another form, entitled "Front Axles for Pneumatic Tires," blueprint of which is enclosed, and sent this to manufacturers of front axles, requesting comment and suggestion.

Column 1 is a nominal truck rating, but is not the basis on which standardization should be attempted. The real basis should be the load which the pneumatic tires will carry. These loads are prety well defined by the tire companies and have the official sanction of the S. A. E. The tire is the weakest link in the chain, for truck users will find that where the pneumatic tires are overloaded they will not get satisfactory results.

Column 2 gives the load on a pair of tires at the ground corresponding in a general way with the nominal truck rating, but determined and limited by the tire size in Column 3. Columns 4 and 5 give the number of spokes and the thickness of spokes between the flange. More than twelve spokes are not necessary for pneumatic service so far as strength is concerned, and they only cut down the clearance around the valve stem, which is necessary for the hose connection.

Columns 6 and 7 are suggested hub and flange diameters. In considering these two dimensions it should be borne in mind that the flange diameter should be about twice the hub diameter where it fits in the bore of the wheel. There are many hubs which do not conform to this practice, but it would be well to bear this in mind in considering any standardization.

Column 8 suggests the number and size of bolts to be used. I asked the axle manufacturers to fill out the form, giving their axle symbol number and the actual hub, flange, bolt circle diameter, etc., to conform to their standard for that axle.

In discussing axles for service with trucks equipped with pneumatic tires I found quite a range of opinion among the axle builders as to load ratings. Some builders do not wish to increase the load ratings of their axles on pneumatic tires beyond the rating on solid tires. This does not seem reasonable to me, because trucks operating on pneumatic tires will not be subjected to the heavy overloads which the solid tire trucks have to stand. The average motor truck axle will stand overloads of 50 per cent without much trouble. The pneumatic tire, according to the manufacturer, will not give satisfactory service with any overload beyond its maximum rating. This feature in itself is quite a protection to the axle manufacturer, in addition to the fact that service on pneumatic tires undoubtedly relieves the axles of a considerable amount of shock load and vibration, which they are designed to stand.

SUGGESTED HUB DIMENSIONS FOR FRONT AXLES WITH PNEUMATIC TIRES

Nominal Truck Rating Tons	Load on Tires at Ground Lb.	Tire Size In.	Spokes		Diameters		Number and Size of Bolts
			Number	Thickness In.	Hub In.	Flange In.	
¾	1700	33x4	12	1⅜	4	8	6—⅞ in.
1	2000	34x4½	12	1½	4¼	8¾	6—⅞ in.
1½	2400	34x5	12	1¾	4⅝	9¼	12—⅞ in.
2	3000	34x5	12	1¾	4⅝	9¼	12—⅞ in.
2½	3600	36x6	12	2	5	10	12—⅞ in.
3½	4200	36x6	12	2	5	10	12—⅞ in.
3½	5800	38x7	12	2¼	5½	11	12—⅞ in.

TABLES OF HUB DIMENSIONS

REAR AXLES ¾-TON

Kind of Tires	Spoke Thickness	Diameters			No. and Diam. Bolts	Brake Drum		Remarks
		Hub	Flange	Bolt.		Bolt.	No. and Size Bolts	
Solid	1¾		7¾	6½	7—⅜	11½	7—⅜	Int.
Pneumatic	1¾	4¾	8¼	6½	6—⅞	6½	6—⅞	
Pneumatic	2	2¾	7 7/16	6 3/16	12—⅞	6 3/16	6—⅞	Int.
Pneumatic	1¾	3	8	6½	7—½	6½	7—½	Semi
Solid	1¾	5	10	8¾	12—⅜	13	6—⅜	Full
Solid	1½	3½	8	6½	7—½			Semi
Solid and Pneumatic	1½—1¾	2½	8¾	6¼	6—⅞	6¼	6—⅞	
Solid	2	3	7½	6¼	12—⅞			Semi
Solid	1¾	4 1/16	8⅞	7⅝	12—⅜	12	6—⅜	Int.

REAR AXLES 1-TON

Solid	1¾		7¾	6½	7—⅜	11½	7—⅜	
Pneumatic	2	3	9	6½	7—½	6½	7—½	Semi
Solid	1¾	4⅞	9⅞	8⅝	12—½	8⅝	12—½	Int.
Solid	1½	3½	8		7—½			Semi
Solid and Pneumatic	2	3¼	9½	7	6—½	7	6—½	
Solid	2	4 1/16	9⅝	8¼	14—⅞	13⅜	7—⅜	Int.
Solid	2	3⅝	9	7⅝	14—⅞			Semi
Pneumatic	2		9	6⅞	12—½			Semi

REAR AXLES 1½-TON

Solid	2		8½	7	7—⅞	13¼	14—⅜	Iut.
Solid	2	3⅞	10¼	8¼	14—⅞	15	7—⅜	
Pneumatic	2	3	9	6½	7—½	6½	7—½	
Solid	2¼	5⅜	11	9⅛	12—⅞	14	6—⅞	Full
Solid	2	4⅞	9⅞	8⅝	12—½	8⅝	12—½	Int.
Solid and Pneumatic	2	4½	9	7⅛	7—?	11		Solid
Solid	1¾	3¼	8		7—½			Semi
Solid and Pneumatic	2¼	3¼	9½	7	6—½	7	6—½	
Solid	2	4⅞	10⅛	9	14—⅞			Int.
Solid	2	3⅝	9	7⅝	14—⅞			Semi

Side Guide and Gripper

REAR AXLES 2-TON

Kind of Tires	Spoke Thickness	Diameters Hub	Flange	Bolt	No. and Diam. Bolts	Brake Drum Bolt	No. and Size Bolts	Remarks
Solid	2½		9	7¾	7—7/8	15	14—½	
Solid	2½	4¾	11¼	10	12—9/16	10	12—9/16	Int.
Solid and Pneumatic	2	4¾	10	7½	7—?			Solid
Solid	2	3⅝	10¼		7—½			Semi
Solid and Pneumatic	2½	4	10¼	8¼	6—⅝	8¼	6—⅝	
Solid	2½		10	8¼	12—½			Full
Solid	2½	5¾	10¾	9	14—½	16	14—⅝	Int.
Solid	2¼	4	10	8	14—7/8			Semi

REAR AXLES 2½-TON

Solid and Pneumatic	2	2¾	7 7/8	6 3/8	12—7/8	17 1/16	12-⅜	
Pneumatic	2½	4	10	8¼	14—½			
Solid	2½	5½	11½	10	14—½	13¾	7—½	
Solid	2½	5½	11½	10	12—9/16	10	12—9/16	
Solid	2½	4	10¼		7—⅝			
Solid and Pneumatic	2½	4	10¼	8¼	6—⅝	8¼	6—⅝	
Solid	2½	5¾	10¾	9	14—½			
Solid	2½	4	10⅛	9	14—½			

REAR AXLES 3½-TON

Solid	3½		13	9⅞	7—½	15	14—½	
Solid	3	7	13¼	12	14—½	17	7—½	
Solid	3	4½	12		7—¾			
Solid and Pneumatic	3½	5	12	10	7—¾	10	7—¾	
Solid	3		13	11	14—9/16			
Solid	3	7⅛	13¼	11½	14—⅝			
Solid	3½	4½	12	10	12—9/16			

FRONT AXLES ¾-TON

Kind of Tires	Spoke Thickness	Diameters Hub	Flange	Bolt.	No. and Diam. Bolts	No. of Spokes
Pneumatic	1¾	3¾	8⅛	6½	6—7/16	12
Pneumatic	1⅜	3¾	8½	7⅜	6—7/16	12
Solid	1⅜	4	7	5 1/16	6—⅜	12
Solid and Pneumatic	1½	3⅝	7	5½	6—?	
Solid and Pneumatic	1⅜—1⅝	4⅛	8	6¼	6—7/16	
Solid	1¾	4¼	9	6⅞	12—½	
Solid	1⅜	3¾	8½	7⅜	6—7/16	

FRONT AXLES 1-TON

Solid	1¾	4⅛	8¾		7—7/8	14
Solid and Pneumatic	1¾	3⅝	7	5½	6—?	
Solid and Pneumatic	1½—1¾	4⅛	8¾	6½	6—7/8	
Solid	2	4⅝	9	7¼	12—½	
Solid	1⅜	4⅛	8¾	7½	7½—7/16	

FRONT AXLES 1½-TON

Solid	1¾	4	8⅛	6½	7—7/8	14
Solid	2	5	10¼	½	7—½	14
Solid and Pneumatic	2	4	8	6¼	6—?	
Solid and Pneumatic	1½—1¾	4⅛	8¾	6½	6—7/8	
Solid	2	4⅝	9	7¼	12—½	

FRONT AXLES 2-TON

Solid	2	5	10¼		7—½	14
Solid and Pneumatic	2	4½	9	7⅛	7—?	
Solid and Pneumatic	2	4⅝	9⅝	7½	6—½	
Solid	2	4 3/32	9½	6⅞	12—½	
Solid	2	5	10½	9	7—½	

FRONT AXLES 2½-TON

Solid	2	4⅝	9½	7½	7—½	14
Solid	2	4¾	10½	9	7—½	14
Solid	2	5	10¼	½	7—½	14
Solid and Pneumatic	2	4¾	10	7½	7—?	
Solid and Pneumatic	2½	4⅝	9⅝	7½	6—½	

FRONT AXLES 3½ TON

Solid	2½	5⅞	11¾	⅝	7—⅝	14
Solid and Pneumatic	2¼	4¾	10	7½	7—?	
Solid and Pneumatic	3	5⅞	11½	9	7—⅝	
Solid	2½	4¾	10	7½	14—½	

It would seem to me, therefore, that the axle builders should approach the subject of hub standardization along the avenue of pneumatic equipped front axles, and I shall be very glad to have your comment on this.

CORNELIUS T. MYERS,
Rahway, N. J.

Simplified Formula for Obtaining Horsepower

Editor AUTOMOTIVE INDUSTRIES:

IN reference to the discussion now going on in AUTOMOTIVE INDUSTRIES regarding the horsepower of an internal combustion engine, the writer wishes to first make inquiry why the formula $\frac{D^2N}{2.5}$ was adopted; if simply for the sake of having a formula, or whether, after making numerous brake tests and arriving at certain horsepowers, it was found that same varied not only directly as the speed but as the square of the bore, as the number of cylinders, assuming of course 1000 ft. per min. piston speed. If such was the case no account was taken of the length of stroke, and while the formula may have been all right when the bore-stroke ratio was 1 to 1 or very near those figures, now that the ratio has increased to 1.5 or even to 2 and greater horsepower is being obtained from the same bore, there should be used a formula that takes into consideration the stroke. The writer has found that by using the following formula figures are obtained very close to the rating given by the manufacturers.

As this formula is subject to simplification, especially now that the manufacturers are giving the cubic inch displacements of their engines, it seems that for ease in computation the formula simplified would be satisfactory, assuming as with the previously used formula 1000 ft. per min. piston speed.

$$\text{Hp.} = 0.1185\ D^2\ N\ S = 0.15 \times \text{displacement.}$$

The constant 0.15 was obtained as follows:

$$\text{Hp.} = 0.1185\ D^2\ N\ S = 0.15 \times \text{cubic in. displacement}$$

$$\text{Displacement} = A\ N\ S \text{ and substituting } \frac{\pi D^2}{4} \text{ for A, we get}$$

$$0.1185\ D^2\ N\ S = \frac{\pi\ D^2\ N\ S\ 0.15}{4}$$

$$\text{Transposing } \frac{D^2\ N\ S\ 0.1185 \times 4}{\pi\ D^2\ N\ S} = 0.15$$

J. W. FRASER,
1516 E. 118th St., Cleveland, Ohio.

IN a recent contribution from Germany printed in AUTOMOTIVE INDUSTRIES of Feb. 26, mention was made of the Colibri drive for bicycles. This was spoken of as a "new German design." The description devoted to this drive was chiefly that of the mounting rather than of the engine. Our attention has been called to this article by a Swedish correspondent who fears that American engineers will get the impression from this article that the Colibri engine is of German origin. He calls attention to the Swedish origin of this drive and states that it is manufactured in large quantities in Sweden for export to other countries. He cites that the numbers of the German patents are 713472 and 713473, which protect both the name and pattern of the drive. American patents on this drive are numbers 1217602 and 1238778.

Side Guide and Gripper

Paying the Worker a Fair Reward on His Just Worth

Recent months of industrial discontent, with living costs rising higher and higher, have seen the wages of the mechanical worker rush upward while the black-coated employee, who has spent years educating himself for his task, has seen himself relegated more and more to the background.

By Harry Tipper

THE present wage systems are the result of growth during the rise of the factory system, and they exhibit, in the course of that growth, the same lack of scientific basis which is true of the industrial organizations as a whole, considered from the human standpoint. In the question of wages, just as in relation to the question of production, a large amount of progress has been made in the mechanical equipment, in the systematic examinations and care of details, and in the mechanical ways for the development of a fair wage calculation, as between one worker and another. But little or no attention has been paid to the factors which enter into the valuation of work, and the changes which must be made in industry, as these various factors change in their individual and relative bearings.

Before the factory system was established, the individual craftsman was paid for his individual skill and the desirability of the finished product of his skill, because of the fact that the subdivisions of industry were very few, and the worker commonly produced the whole of the finished product. This determination of comparative individual value was arrived at very simply by the reflection of the market for the particular piece of goods. Thus, the finished product from each of a small group of workers, placed on sale by the master craftsman or employer, brought different prices from the user, because of the difference of the user's valuation of the individual pieces, and this difference determined the status of the worker. In effect, therefore, the worker secured the direct benefit of his production effort and skill in proportion to the direct market valuation of the product which he made.

Standardization was introduced as the factory system produced machinery which would repeat the same operation with sufficient rapidity to permit a much larger production. This standardization in the operation led to a uniformity in the rate of pay and, as the rate of pay had always been based upon time, the uniformity in the time rate became more or less general. It is true that piece-work was employed all through the evolution of the factory system in a great many lines, but the evils which arose from the piece-work method of payment, before enlightened public sentiment had forced a different consideration, induced the labor unions to fight it and eliminate it wherever possible. In the early growth of the factory system, piece-work was associated with the fine and penalty system. Because the manufacturer owned the equipment, he therefore owned the means of work, and wherever labor was plentiful he was able to reduce the piece-work rate, so that the worker secured no particular extra reward for the extra skill and rapidity which he developed.

> **The increasing uniformity in the requirements of certain classes of work requiring a uniformity in the rate of pay, either on time or piece-work, and the evils of the early piece-work system have been responsible for the development of opposition and a continuance of that opposition in trade union circles to any such methods of payment. They have also been one of the most important sources of the bitter suspicion and distrust which grew up between the worker and the employer. Complaints are made continually that the trade unions do not live up to their agreements and the complaints are justified. Nevertheless, the manufacturer of to-day would be ashamed if he was intimate with the history of piece-work conditions during the first fifty or seventy years of the factory system and saw how constantly the employer, without warning and without any other reason but profit, broke his agreement and changed the rates of pay which he gave to his worker.**

Instances can be found, even to-day, where piece-work rates are either sufficiently elastic, sufficiently complex or sufficiently indefinite to permit the manufacturer to limit the earnings of the worker and to constitute in the mind of the worker the breach of an agreement.

In Great Britain, where the conditions are affected more fully by the early mistakes and injustices of the evolution of the factory system, the piece-work rate is almost unknown in many industries and it has been banished from many of the most important.

> **In this country, payment by results is more general and, of course, it does not suffer to the same extent from the earlier abuses, although its history is not anything to be particularly proud of. But even this payment by results does not now establish a comparative valuation of work which can be satisfactory and which can remain satisfactory to the industrial fabric.**

The present valuation for any groups of workers is based almost entirely upon the so-called law of supply and demand, modified by the power and strength of labor organizations in the group. This method of valuation tends always to a lack of balance in the labor market. Where there is a shortage of individual labor, or where the groups are well organized they are able to force an increase in the rate of pay and other groups of labor

suffer in comparison. It is true, of course, that theoretically this tends to balance the situation, because the change of labor from one group to another has a tendency to bring up the price of the other group, but practically there is no such condition at any time and the market is always unbalanced.

The lack of balance in the labor market is not the most serious effect of this condition; the most serious effect is the continual unrest which is a necessary concomitant of the unbalanced condition.

When teachers and college professors are paid less than day laborers, there is not only a shortage of teachers, but there is widespread unrest, dissatisfaction and complaint of injustices within the ranks of those who continue in the teaching profession.

There is, of course, a diminution in the skill and capacity of those who stay and those who enter, and the whole value of the educational part of the work is diminished. When engineers, draftsmen, accountants and other important branches of industry see the skilled mechanical worker receiving so much larger a share in the proceeds, the capacity of the men who enter the engineering field is lowered on the average and the unrest is increased.

The effect of a continuance of this unbalance and this lack of any basic valuation of work is to be observed in the present situation of Great Britain, much more clearly than it can be observed in this country. This is true because the condition has existed longer, the industrial divisions are more sharply defined, the economic pressure is greater and the symptoms can be determined more readily. In that country, there are organizations of teachers, of government employees, of engineers and of other black-coated workers, as they are called, and the intelligent strength of the socialistic party and the independent labor party come from the ranks of those professional men. It is not without interest that the new type of socialism, which is called Guild Socialism in Great Britain, is headed by a group of Oxford men, and it is equally interesting to find Oxford and Cambridge men—professional men—heading the independent labor party and chosen as the representatives of labor.

No amount of discussion of the so-called laws of supply and demand and no amount of explanation as to the reason for costs will satisfy the man who has spent several years training himself for a difficult occupation and who finds after his training and his experience that his responsibilities have brought in nothing more than a poor position with less comfort and greater sacrifice than is demanded of the uneducated, unskilled worker who can become proficient in a few days.

Where the worker controlled the details of his industry and made the whole of the product, rewarding him according to the law of supply and demand was a fairly just method of reward. As he controlled the details of his trade, he owned the means of production and as he made the whole of the product, the character and value of the finished product was his direct responsibility.

In modern industry, however, where no man or group of men contribute more than a small part to the value of the finished product and where most of them have control over only a minor portion of it, the payment of wages as a comparative matter between various occupations according to the demand for, and the organized strength of the group, emphasizes the injustice, increases the unbalance and puts a premium upon strikes, labor organization and warfare.

This is the fundamental difficulty with all general profit sharing, partnership and other systems for increasing the reward of active workers. These are not founded upon any greater analysis than the regular wages. They bear no relation to the amount of time and effort which must be given to acquiring proficiency in operation and education in judgment. They do not take into account either the cost or the length of time involved in acquiring the necessary background of experience and, while they ameliorate conditions temporarily, they will not and cannot provide a permanent remedy for the unrest which is constantly developing. Not only is this the case, but the whole wage system as it relates to operation, tends to remove the sense of individual responsibility by placing all the workers within the same group upon a uniform basis.

In this respect, the metal trades field is much more fortunate than any other line of industry, because the operations themselves offer more variety, call for more judgment and allow an opportunity for the expression of individual values to a greater extent and for a considerable portion of the work. Nevertheless, even in these industries, the increasing standardization and the increased development of special equipment for such standardized operations is increasing the number of jobs where the judgment and the individual skill are not an important part of the work. When the conditions of the work are sufficiently uniform and the basis of reward sufficiently standard, the sense of individual value becomes so small a part of the total value of the operation that the sense of personal responsibility is almost destroyed.

It is desirable that the industrial engineers in considering the question of efficiency should consider not only the study of motions, the mechanical systems of payment and the application of bonuses, but they should study the factors of comparative value in connection with different operations of work so that some logical basis might be established and a greater degree of balance maintained in the reward for service in connection with the manufacture and distribution of product.

The Belgian Automotive Industry

THE production of automobiles in the factories of Belgium has reached about 50 per cent of the prewar output, says a recent report by Trade Commissioner C. E. Herring of Brussels to the Bureau of Foreign and Domestic Commerce. However, the Belgian industry, Mr. Herring states, is occupied more with repairing and rebuilding than with the construction of new cars, as the periodical public sales of automobiles recovered from Germany has forced this condition. The number of garages in Belgium has almost tripled since 1914.

The total imports of passenger cars and trucks into Belgium during the month of January were some 3487 vehicles, valued at 42,696,119 francs, the report states, only 10 per cent being from the United States. But despite the adverse exchange conditions, the American cars are being seen in increased numbers on the streets of Brussels, and Mr. Herring believes a considerable number of American electric cars might be sold there. The excellent paving in most of the Belgian cities and the general flatness of the country throughout Flanders would be favorable factors, the commissioner believes.

Of the Belgian builders, only one exhibited at the Paris show. The model, according to Mr. Herring, caused considerable comment and was said to have equalled the best of the American machines that were exhibited.

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

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A. B. Swetland, General Manager
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A Normal World!

A BANKER had been studying world trade figures to find, if possible, the solution of the difficult commercial conditions. Among the conclusions that he reached was this statement:

"World trade to-day is so involved and so interdependent that this world cannot be normal until Russia is normal."

There was no sentiment in the paper that this banker wrote and which contained this statement. It was all figures and purely a commercial proposal. The interesting fact is that he has reached the same conclusion that has been set forth many times by persons who approached the same question with humanity uppermost in their thoughts.

The same thought applies to the Central European countries. That section, disturbed as it is and uncertain of its future, must become normal before the world can become normal. The normal man of to-day is the busy, contented individual engaged in the production of something that is more or less useful.

The part before the American business man to-day is to assist, by direction of his trade, toward this goal. There is no question to-day of enough business for all production for years to come, and it is the duty of every business man to so direct his business that he will assist as much as possible to this end.

Truck Salesmanship

ONE of the most perplexing problems in the selling of the larger sizes of motor trucks is that of dealer representation in the medium and smaller-sized centers. It is generally impracticable for the factories to maintain direct branches in such cities and it frequently is impossible to obtain local representatives who have the requisite transportation knowledge, leaving out the consideration of financial and service requirements, to handle adequately the sale of such large vehicles.

The salesmanship either of fleets of trucks or of the larger sizes involves transportation engineering. It requires expert education and technical knowledge to analyze the trucking needs of a large concern and to persuade a buyer that his needs may be met more efficiently and economically by the use of motor trucks. Some products of the automotive industry practically sell themselves and require no effort on the part of the salesman. But this is not so with the larger trucks; ability and knowledge, backed by transportation engineering, are needed before the prospect will sign his name on the dotted line of the contract.

A trip through the smaller towns will reveal the unfortunate circumstance that many automotive dealers are apathetic when it comes to the sale of motor trucks. They have had one line and then changed to another; they have been unable to make the truck pay for itself, or they have become discouraged for one cause or another. They do not doubt the ability or the mechanical worth of the truck itself. But for some reason, generally not clear even to the dealer himself, sales haven't been recorded, with the result that the factory has practically lost a good territory.

These facts are coming more and more to the fore. Indeed, they are almost as old as the truck itself. They particularly are noticeable—and sometimes with the small-sized trucks—in the agricultural districts and their detriment has worked against the idea of farm motorization.

The solution of this difficult problem can scarcely be individualized. It must be worked out between the factory and the dealer and is only another phase of the educative salesmanship that must be undertaken by the truck manufacturer.

Methods of Supercharging

IT is pretty well agreed at the present time that for high speed and maximum economy of flight the principle of supercharging offers advantages. By forcing into the engine cylinders a charge larger than could be gotten in by simple induction, the output of the engine can be maintained substantially constant up to high altitudes, and by flying at high altitudes, where the atmosphere is rare, the resistance to flight can be reduced and the speed and economy increased.

Supercharging can be effected in different ways.

We may equip the engine with a separate pump, driven either mechanically or by the exhaust gases; we may precompress the charge in the crankcase, taking advantage of the fact that there are two compressions in each section of the crank chamber to one power stroke in the corresponding cylinder; finally, we can so proportion the engine that an effect similar to supercharging is obtained without the use of any extra compressing devices.

At present there seems to be an inclination among aircraft engineers to seriously consider the last-mentioned method, while all the earlier work was done with separate superchargers or pumps. The method referred to consists in designing the engine with such a high compression ratio that at the height at which it is desired to fly the compression in the engine will have a normal value. This would probably require a volumetric compression ratio of 8 to 1 or even 10 to 1. The engine would not give any remarkably high output when judged by its piston displacement, but, on the other hand, it would not have to be designed with a great deal of surplus strength, as the force of explosion would be less than with true supercharging.

One might regard the machine as comprising an engine and a charging pump in one, part of the stroke serving merely to get the extra amount of charge into the cylinder and the rest for turning the heat energy of the fuel into mechanical energy. As compared with an engine equipped with a separate supercharger, the engine employing the method here described would have the advantage that the charge would be expanded in a much greater proportion and the thermal efficiency would therefore be materially higher.

The one objection to this system of operation is the danger of accidentally getting full charges into the cylinders at low altitudes. This might result in such enormous explosion pressures as to wreck the engine. Some very reliable means for preventing this would be essential to the success of the system.

Dignity of Labor

THE ultimate aims and ideas of managers and the men who work for them are not so far apart as some prophets of industrial disaster would have us believe. It is interesting to note how close, in some points at least, the leaders of labor and the best thinkers among American employers are in agreement.

Speaking recently in New York, Samuel Gompers said that our people must be taught to respect the dignity of manual labor. It is wrong, Mr. Gompers stated, to look down upon a man or an occupation because the work is hard and dirty and calls for actual physical toil. It is too often the ambition of mothers and fathers to have their children work at a desk; they too often look down upon the man who works in the mills and factories. No man likes to be looked down upon and the natural and inevitable psychological reaction to this attitude is one likely to cause discontent and unrest.

Compare with these sentiments what has been written recently by the president of an important New England machine tool concern. This man is at the head of an efficient industrial organization, but has never had the slightest trace of unionism in his shop, nor has he dealt with unions in any way. "Each one should strive to succeed in his own particular way on his own natural work. Some men are built for doing things, others for directing, recording, accounting, and in various ways co-operating with the real workers. To preach that it is dishonorable to work with the hands and that dignity goes only with the position in which the pencil is used instead of the implements that change the form of things; that positions of authority are the best—all such talk is contemptible stuff. To say that the worker is the underdog, that he is ever envious of and oppressed by the man who directs the work—all this is a malicious libel that should be struck out of existence by more general knowledge of the real facts. There are men who are born to work with their hands—they are happiest in their natural element and any one who caricatures them for political or commercial reasons, to put it mildly is not their friend."

Intelligent opinion among management and workers has recognized that the distinction between the white collar and the manual workers is largely a false one.

Standardizing Truck Models

A TRUCK parts maker is sounding that branch of the industry on a proposal to standardize and minimize the number of models offered to the consumers. The sizes proposed in this communication are 1-ton, 2-ton, 3½-ton and 5-ton. This would eliminate ¾, 1¼, 1½, 2½, 3, 4 and 4½ ton sizes. The argument is that in standardizing on these sizes the production of truck parts would be cheapened and production facilitated by the elimination of different sizes of parts.

It is easy to see why there are so many sizes of trucks, stated by capacities. The sales department always wanted something to talk about and it is more than probable that a good many of the fractional capacity trucks were originally designed for even ton capacity and then were changed to give the salesmen talking points.

It would appear, however, that this is a question to be answered only by the consumer. If we could reach the entire truck using population and ascertain the exact number of owners who have real need of a vehicle that will transport 2¼ tons for a purpose that a 2-ton vehicle cannot be used, it would shed much light on the question.

Casual acquaintance with men who use trucks leads to the belief that the loading of trucks is not a matter of weighing to the quarter of a ton. Usually the makers of trucks that have fractions more or less than 2-ton say that these trucks are made especially for farm use. The farmer as a rule is not a careful loader of a mechanical vehicle. Most of his loads are of such a nature that he cannot well load more than 2 tons.

It would seem that, in this case, the burden of the proof is on the manufacturer who makes the various sizes.

Transportation Key to Trade Activity

Industry Must Demand Co-operation of Rail, Water and Highway Carriers

(*Continued from page* 1144)

inventories to get them evened up and this will release credit which can be used to better advantage. The industry never will have a finer opportunity to prove that it makes transportation and that it can stand on its own two legs. It can find motor trucks enough for its own needs and some to spare for other industries which have no such resources. It can lend a hand to the parts and accessory makers and keep their wheels moving. There will be neither steel, credit nor market to make a reality of the splendid program of productions mapped out for the year, but there will be steel, credit and markets for all the cars they will be able to make.

There is no disposition anywhere to divert either steel or credit from the manufacturers of trucks and tractors. The country will absorb all the trucks it can get and cry for more. It must have them to fill the gap left by the breakdown of the railroads and it will be years before the carriers catch up with their equipment needs. When that time comes they will have lost to motor trucks most of the less than carload lot business and they say they will not be sorry.

This is no time for pessimism. The optimist is the man who will win. Even in the days of the war there was no greater need for patriotism and constructive statesmanship. The future of the nation depends upon the courage of its captains of industries. There will be no panic if they keep their heads and resolutely refuse to be daunted by the difficulties which beset them.

A major operation is necessary to bring out deflation of credit and cure underproduction. It will not be painless because it is impossible to administer an anesthetic, but the patient will recover and be stronger than ever. There are many ways in which the doctor can be helped and he needs a lot of nurses.

Vast Capital Represented

Organization and co-operation never were more essential than to-day. The National Automobile Chamber of Commerce and the Motor and Accessory Manufacturers' Association represent more than one billion dollars of invested capital. More than three million souls are dependent upon their members for a livelihood. This vast industry cannot lightly be thrown out of joint. The representatives of these organizations can exert a tremendous influence upon the banks and upon Washington.

The dealers have as much at stake as the manufacturers. Not only the National Automobile Dealers Association but every city and state organization can devise ways and means of increasing the efficiency of motor truck transportation. There are many ways in which they can lend their support to the manufacturers.

There is one respect in particular in which every element in the industry can work together and that is in demanding co-ordination of rail, water and highway transport.

They can insist that conferences be called at once of representatives of these three factors in transportation. It is not absolutely necessary to devote these conferences to academic discussions. It is possible to get down to brass tacks and force concrete results.

Labor should not be permitted to forget that it has as much at stake as the manufacturers.

Nor should it be overlooked that the United States still is technically at war and that the President has only to issue a proclamation to put the nation on a war footing so far as transportation, finances and the classification of industries are concerned.

National Develops New Touring Model

INDIANAPOLIS, May 15—A new four-passenger phaeton model will be built by the National Motor Car & Vehicle Corp. Extreme narrowness is a characteristic of the car, the rear seat being no wider than the front—40 in. The cowl is longer than in the regular touring model, and the rear compartment shorter, giving room for a small afterdeck. By suspending the body on brackets riveted several inches below the upper edge of the chassis frame, the body sides have been dropped closer to the ground without sacrificing road clearance, and the conventional high running board apron is replaced by a narrow valance.

Mississippi Makes Seaport of St. Louis

Barge Lines Doing Extensive Business in Transportation of Automobile Products

NEW ORLEANS, May 15—St. Louis is rapidly becoming a "seaport," and the automobile manufacturers of the Mississippi Valley are largely responsible for its advancement, according to a report recently issued by the management of the Government-controlled barge lines operating between St. Louis and New Orleans on the Mississippi River. Millions of tons of freight are shipped from New Orleans to St. Louis, after being unloaded from deep-sea vessels in the Louisiana port. But the return cargo on these big barges consists, to-day, in large part, of automobiles for export direct to virtually all the countries of Central and South America.

The Moon Motor Car Company, in St. Louis, for example, boxes automobiles at its St. Louis plant and ships them direct via these barges, to shipside in the stream at New Orleans, whence they go to Buenos Aires, Rio de Janeiro, Sao Paulo, Rio Grande do Sul, Barranquilla, Guayaquil, Valparaiso, and other ports on both coasts of South America.

The big General Motors plant, now rapidly approaching completion in St. Louis, announces that it will export passenger cars and trucks and tractors in the same manner. Other automobile factories, either building or contemplated in St. Louis, will take advantage of the "seaport" location of their city to reach far-away markets, hitherto closed to them by prohibitive rail rates to the three coasts, the only method by which they could reach these markets.

Revised Export Figures for 1919

WASHINGTON, May 18—Revised figures for the 1919 export trade of the American automotive industries have been published by the Bureau of Foreign and Domestic Commerce, revealing some changes and some additions to the totals recently published. They added, for the first time, the importations of cars into the United States, the total being 117 with a value of $123,025, while the parts brought in were worth $278,003. The export statistics follow:

	Commercial Cars	Passenger Cars	Parts	Tires	Gas Engines
Number	15,585	67,145			31,358
Value	$35,425,437	$73,700,527	$42,562,186	$28,924,659	$4,738,341

The imports, the greatest part of which were from Canada, were as follows:

	Automobiles Number	Automobiles Value	Parts, Except Tires
Belgium	..	.....	$42
France	13	$58,499	53,748
Italy	5	14,160	19,800
Spain	..	.....	407
Sweden	..	.....	400
England	3	16,483	51,396
Canada	94	33,483	143,826
Mexico	1	200	500
Cuba	..	.....	279
China	..	.....	7,585
Japan	..	.....	20
Australia	1	200	.....
Total	117	$123,025	$278,003

Schroeder Altitude 33,000 ft. Officially

Bureau of Standards Report Gives Corrected Figure After Study of Instruments

The Bureau of Standards calibration of the two barographs used by Major R. W. Schroeder in his altitude flight on Feb. 27, 1920, has just been completed and report made to the Air Service.

Two Henry J. Green barographs were used in this flight. As the clockwork on one of the barographs stopped during the flight before the highest point was reached it became advisable to discard the record of this instrument in attempting to correct the records. The ground pressure existing at the time of the flight, according to the McCook Field mercurial barometer, differed considerably from the result obtained by correcting the pressure given by the Weather Bureau barometer at Dayton for the proper difference in elevation.

Consequently the former figure was discarded on account of the probability of its being erroneous. Comment was made in the bureau's report on the extremely large instrumental errors found in each of the barographs, thus introducing some uncertainty into the calculations. The report gives the following determination of altitude:

Pressure difference from flight-history test	21.67 in.
Correction due to error of Boyce motometer	0.34 in.
True pressure difference	22.01 in.
Ground pressure, McCook Field, at start of flight (by Weather Bureau barometer corrected for difference in altitude of 150 ft.)	29.49 in.
True pressure at highest point	7.48 in.

Isothermal Altitude 37,850 Ft.

Isothermal altitude corresponding to 7.48 in. (A.I. Cir. No. 3)	37,850 ft.
Isothermal altitude corresponding to 29.44 in. (ground pressure at time highest point was reached by Weather Bureau barometer corrected for difference in altitude of 150 ft.)	420 ft.
Isothermal difference in altitude	37,430 ft.
Temperature correction for height of air column (mean temperature —29.2°C)	5,180 ft.
True difference in elevation	32,250 ft.
McCook Field above sea level	750 ft.
Probable altitude above sea level	33,000 ft.

Calculation of Schroeder's altitude in accordance with the rule of the Federation Aeronautique Internationale gives a considerably higher figure than the figure obtained by the Bureau of Standards method of calculation, the latter figure, of course, being the nearest approximation to the true altitude. Applying the F. A. I. rules for 1919, as interpreted by the Aero Club of America, the following altitude is obtained (in this case the temperature correction to the air column is not applied):

Isothermal difference in altitude as already computed	37,430 ft.
McCook Field above sea level	750 ft.
Apparent altitude reached	38,180 ft.

The Bureau of Standards' calibration was undertaken on the request of Lieut. Col. Hickam in order that all doubt as to the true altitude attained might be removed.

Purifier Company Locates in Buffalo

TORONTO, May 17—The Universal Gasoline Purifier Co., Toronto, has established headquarters at Buffalo, N. Y., to take care of United States business. The concern manufactures a gasoline strainer for insertion in the fuel line close to the carbureter. The casing is made of aluminum, and the purifying media consist of 60 mesh screening and a chamois diaphragm and are inclined at an angle of 22 deg. to the vertical, thus permitting gravity and vibration to keep them clean. It is claimed that this inclination makes it impossible for fluff, etc., to float and interfere with the filtering media. Trouble from water freezing and interfering with the flow of the gasoline is also said to have been eliminated. The gasoline passes first through the screening and then through the chamois. There is a plug at the bottom of the bowl which can be removed to drain off impurities that collect, and the cover can be unscrewed if necessary to get at the inside of the purifier.

MARTIN BUILDS NEW BOMBER

NEW YORK, May 15—The Glenn L. Martin Co. has completed another new type of torpedo plane for the United States Navy. This plane was given a trial test a few days ago at McCook Field, Dayton. Both army and navy officials witnessed the test and considered the performance an unusual success.

The new Martin navy torpedo plane has a total gross weight of 11,910 lbs., which includes a useful load of 4950 lbs. In addition to its crew of three men, pilot, navigator and gunner, this plane carries a 1650-lb. torpedo, 450 lbs. of bombs, two Lewis machine guns, a radio set, a complete equipment of instruments and accessories, and a supply of fuel for four hours' operation.

It has a flying speed of 107 m.p.h. and will climb from sea level in ten minutes to an altitude of 5100 ft.

MARCH IMPORTS 11 CARS

WASHINGTON, May 15—Imports of foreign automobiles into the United States during the month of March totaled 11 cars, valued at $14,099, according to reports just made public by the Bureau of Foreign and Domestic Commerce. Parts were imported of a value of $42,236.

Railroad Congestion Slows Tire Output

Goodyear Cuts Down to Five-Day Week—Labor Surplus Now Reported

AKRON, OHIO, May 15—Lack of railroad facilities for the shipment of finished tires is a source of great concern to manufacturers in this territory. So serious is the situation that manufacturers are bidding for vacant factory room, storeroom and any space where it is possible to store the finished product. The subway connecting the Goodyear plant with Goodyear hall is filled as are all vacant rooms in the Goodyear factory.

How long this situation can continue is a problem, but many factory executives declare that a shut-down is imperative unless some relief from the freight tie-up develops. Goodyear closed its plant last Saturday morning at 7 o'clock, and kept it closed until Monday. This plan will be continued until transportation conditions improve, or until such time as more frequent interruptions to production, or a temporary shutdown are decided upon.

While most of the other large plants have been able to continue operations without laying off men or operating on the five-day basis, they hire no new men and are holding out no wage inducements. This has resulted in a large labor surplus in Akron, available for other industries, and for the first time in many months it is possible to secure labor in almost any amount.

But for the aid of trucks in distributing the finished product and the receipt of trainloads of rubber and fabric, the trains being operated by special crews and brought through to Akron without switching, manufacturers say a shutdown would have occurred ere this. These facilities, however, cannot cope with the distribution problem, and only a loosening up in the freight car situation can save Akron from a season of depression.

MUSEUM GETS CANADIAN CAR

MONTREAL, May 15—The first automobile ever constructed in the province of Quebec will be added to the collection of relics in possession of the Chateau de Ramepa. This machine, which was manufactured under the enterprise of J. H. Dandurand and William Jennings and his father in 1895, was offered to the society by Dandurand in a communication received last night, the offer being accepted with thanks. The machine will be installed in the basement museum.

TO SELL KEANE PLANES

CINCINNATI, May 17—Sport planes are to be retailed in Cincinnati by the Pan-American Aeroplane Co., headed by C. H. Truitt. A suitable landing place is being sought here by the company for demonstration of the Horace Keane plane, a 25-foot plane with an Ace four-cylinder engine.

General Acceptance to Double Business

Increases Capital to $4,000,000 and Surplus to $1,000,000 to Meet Demands

NEW YORK, May 17—To permit an increase in its business to a size commensurate with the demands upon it, the General Motors Acceptance Corp. has been authorized to raise its capital and surplus from $2,500,000 to $5,000,000. The capital stock now authorized is $4,000,000 and the surplus will be increased from $500,000 to $1,000,000.

The corporation now will have double the facilities for financing the sale of General Motors automobiles and other products on the deferred payment system. It is expected this announcement will be welcomed by bankers as it will place additional financial facilities at the disposal of dealers and enable bankers in return to obtain additional collateral gold notes founded upon the obligations of automobile dealers and purchasers. The corporation is now doing a business at the rate of $150,000,000 a year.

When the increase in capital was authorized, officers and directors were elected by the corporation. A vice-presidency was created for Curtis C. Cooper, formerly secretary, while George H. Bartholomew, who was Cooper's assistant, has been promoted to secretary. Other vice-presidents elected were John J. Schumann, who has been in charge of the sale of collateral gold notes to bankers, and Albert L. Deane, who has been manager of the New York branch. Other officers are:

President, J. Amory Haskell; vice-presidents, John J. Raskop, Paul Fitzpatrick and Alfred H. Swayne; treasurer, Reune Martin.

British Firm to Make Straight Wall Tire Rim

LONDON, April 26 (*Special Correspondence*)—Simultaneous with the announcement from America in AUTOMOTIVE INDUSTRIES that the Goodyear Tire & Rubber Co. is opening a factory to produce rims and wheels for the straight side tires so popular on the continent, it is learned that W. Goodyear & Sons, Ltd., of Dudley, England, are erecting a similar plant for the production of the same class of rims to accommodate the straight wall tire, which is a new thing on the British market.

This enterprise is due to their confidence in the experience in tire making gained by America which has taught them that the new type of tire is in every respect superior to the crude and antiquated clincher type in vogue in Europe and it has induced them to make rims suitable for this type of tire as a standard equipment for all their rim and wheel products.

The plant which they are opening is the latest and most up-to-date in the world. In the near future it will be possible for car manufacturers and users to adopt this superior class of tire on any cars they care to specify—Goodyear Wheels and Rims—and on such cars as have the old equipment, the Goodyear company will arrange a system of exchange from the old type to the new. All varieties of wheels will be so fitted, wood, wire, pressed steel and disk. Certain patented improvements will be embodied which give greater ease of detachment.

Richmond Reserve Cautions on Credits

RICHMOND, VA., May 15—Banks in the Fifth Federal Reserve District are curtailing credit for everything except actual commercial needs. In line with the general policy of the Federal Reserve Board, automobile paper is scrutinized with care, although there is no general rule for its rejection. Persons buying cars to use for business purposes have little difficulty in getting accommodation at the banks, but unusual precautions are being placed around loans to buy cars for what are described as "pleasure" purposes, without ample endorsement.

This attitude is held to be justified by recent court decisions upholding statutes for confiscation of automobiles used for certain purposes, even if without the knowledge or consent of the owners. This decision, it is contended, makes the car itself poor security for deferred payments, as any unauthorized use may lead to confiscation under the prohibition enforcement act, without redress for the owners.

FORD PARTS PLANT STARTS

HAMILTON, OHIO, May 14—The plant erected here by Henry Ford & Son for the manufacture of transmissions for Fordson tractors is in partial operation. About five of the 20 divisions are being operated with a force of 250 men. When the plant is in full production it will employ about 1200 men on two working shifts, permitting a capacity of 400 transmissions a day.

A power plant is being erected in connection, which probably will be large enough to supply power to the city of Hamilton. This plant will be operated by power generated by the damming of streams feeding the Miami River by the flood-prevention organizations of that district to prevent a recurrence of the Dayton flood disaster.

OVERLANDS FIRST IN TEST

LOS ANGELES, May 15—Results of the fourth annual Los Angeles-Yosemite Valley gasoline economy run were announced to-day. An Overland touring car won in Class 1, an Overland sedan in Class 2, a Templar touring car in Class 3 and a Dorris touring car in Class 4. The run was conducted on the ton mileage basis. The distance was 355½ miles. The Overland touring car averaged 60.74 ton miles per gallon of gasoline; the Overland sedan, 51.41; the Templar, 49.20; the Dorris, 47.64.

Up-State Bankers Curtail Car Loans

Syracuse Reports Credit Demands Exceeding Local Resources—Urge Cash Transactions

SYRACUSE, N. Y., May 12—Automobile dealers in a number of central New York cities and towns have been informed by their bankers that there must be a curtailment in the handling of passenger car paper. In several communities dealers have been called into conference with banking officials and advised to hold down on time sales, and a number of bankers have taken the initiative in impending transactions of this kind by advising clients against other than cash purchases of automobiles.

Syracuse bankers are acting cautiously in extending credit on automobile business, but say they are doing no more in this line than bankers in other cities and curtailing no more on cars than in other lines of business. The Federal Reserve action in establishing a 6 per cent loan rate, they state, prevents bankers taking on new credit customers. In a word, they say, the demands on the banks exceed local resources and curtailment under such conditions is inevitable.

In Syracuse and throughout a number of neighboring counties dealers generally report that their banks are extending the credits necessary to conduct their business, but a few dealers whose borrowing has been more liberal than others and who are holding considerable sums in unpaid notes of car owners, have found the situation troublesome.

Some of the small town bankers hereabouts have been inclined to refuse loans to car purchasers, but the willingness of a competitive bank to meet the client's demand, at the same time winning over his banking business, has been a deterrent. As one banker ruefully put it, "We try to influence our clients not to buy automobiles unless they have the cash, but most of them do it just the same. It's pretty hard to discourage a man who wants to own a car."

Bankers generally in this territory are liberal in supporting purchases of trucks and tractors, even when credits are longer in term than on passenger cars.

HOSKINS TO MAKE NEW AXLE

DETROIT, May 15—Manufacture of passenger cars as well as truck axles will be undertaken on this continent by G. J. Hoskins and sons, wealthy Australian iron workers identified with the steel industry for years. The passenger cars will embody the Australian front drive invention of Hoskins. A test car already is in use in California. The drive is a self-centering, co-ordinated, radio spherical gear adapted either to motor cars or trucks. Present plans call for an early start on the manufacture of axles at some point in Canada under English patents. Manufacturing also will be done in the United States but the site of the plant has not been selected.

Handley Page Files Two Incorporations

Will Conduct Transportation System, New York to Chicago, and Sell Planes

NEW YORK, May 15—Plans of the Handley Page interests of Great Britain to unload a large part of the surplus British military airplanes, engines and equipment in this country came to a head here to-day with the announcement of the formation of two companies, the Aerial Transport Corp. and the Aircraft Sales Corp. The former was said by its promoters to embrace a huge aerial transportation system that would utilize 500 British machines in carrying merchandise between New York, Cleveland, Chicago and Minneapolis. The second company, organized under Delaware laws, was to dispose of 2,500 British airplanes, 5,000 engines and accessories, a fair-sized proportion of the surplus army material recently taken over by Handley Page, Ltd.

The backers of the plan were announced by W. H. Workman, the New York representative of Handley Page, to be the following: Lieut. Commander P. N. L. Bellinger, who piloted the NC-1 in the transatlantic flight, who will be secretary of the transport company; Col. R. S. Hartz, formerly of the American air service, pilot of the "around the rim" flight, who will be chief of personnel; Major A. W. Harris, formerly of the American air service; John A. Jordan, chief of construction, United States aerial mail service, and Judge Grey, of Buffalo, who will be president.

Dumping Attempt Expected

Reports have been current in this country for several months that Page, who formed the Aircraft Disposal Co., of England, to handle the surplus British equipment, would attempt to dump a large share of his equipment in this country. This included some 10,000 planes of various types, 35,000 engines and a vast amount of equipment. Page visited America early in April and at that time took up the disposal with various American interests. He then proposed a huge transportation company that was to ally itself with the American Railway Express Co. in the handling of rush shipments between the larger American cities, the understanding being that much of the flying would be done at night. This end of it was dropped, apparently, and no further efforts were made to secure business from the express company. This fact lends interest to the announcement of the new transport company, which follows:

"Arrangements have been made with leading commercial interests since the acquisition of these airplanes for the transportation of merchandise and the contracts already negotiated show that the volume of merchandise to be transported will assure these airplanes leaving daily on schedule time with a full load. On this account, it will not be possible to start carrying passengers this year. We are glad of it because for passenger carrying we want the best airplanes that American engineers and American constructors can produce."

Admittedly, the material to be used and sold by the companies will be British, obtained from a surplus that was purchased at low cost.

"We communicated with all the American aircraft manufacturers and visited the plants," the announcement adds, "only to be told by each of them that the airplanes could not be obtained this year. We were told by the manufacturers that only a half dozen airplanes could be obtained by the end of 1920."

Start Service in July

July was named as the date for starting the service, with DH-9 and DH-10 planes, some of them equipped with American Liberty engines, to be used. Feeder lines to the main transportation system are in prospect, the announcement states, and an Eastern terminus is being arranged in the metropolitan section of New Jersey.

Reports to the newspapers stated that the transport company had contracted with the American Railway Express Co. for the utilization of half of the airplane cargo space. This, however, was denied emphatically by R. E. M. Cowie, vice-president of the express company, who said that he had had no further connections with the Handley Page concern than to talk over a proposed contract with Mr. Page when he was in America.

"There is no contract," Mr. Cowie stated.

Frequent attention has been called to the possibilities of the British dumping their surplus equipment in this country and the present venture is taken as a verification of the fact that they will do so. The Aircraft Disposal Company of Great Britain purchased the British army surplus on a basis of 1,000,000 sterling, with 50 per cent of all profits to be returned to the Air Ministry. Surveys of the property by English aviation experts was that the equipment involved originally had a valuation of some 100,000,000 to 150,000,000 sterling, thus making the cost of the equipment to the syndicate about one per cent of its estimated original worth.

57 Planes Already Exported

This figure has been corroborated by private interests which have been informed officially that some 57 airplanes, presumably DH-9 and DH-10 types, with Rolls-Royce engines, were exported the first week in May from London to this country. Another report, semi-official in nature, was that 150 of these machines either were being shipped or already were in this country. The cost value of machines similar to these was said to have been some $18,000, which would give them a cost to the Handley Page interests of some $180, but from the same source it was given out that the American company had purchased these machines on a basis of about $1,450 each from the English owners.

G. M. C. Insurance Meets Opposition

Dealers Insist Patronage of Local Insurance Men Is Better Business Policy

BINGHAMTON, N. Y., May 15—Representatives of the General Motors Corp. who are seeking to interest dealers in General Motors products in the central and southern New York territory in the company's automobile insurance plan, are meeting with considerable resistance on the part of dealers. A number of merchandisers of General Motors products, principally cars, have refused point-blank to consider the insurance plan.

They insist that they cannot, in justice to their own business, withdraw their insurance patronage from local insurance business men, who in turn are often liberal patrons of their establishment. Regardless of the merits of the General Motors plan, the dealers who object to it feel that they must stand by the local insurance man to retain his trade and the trade of friends and acquaintances he influences in cars, trucks, tractors, tires, automotive equipment and service work.

Several dealers in a considerable group of counties, east, north and west of this point, report lengthy arguments with General Motors field men, all with the same result, the field men departing insisting that the dealer take on the insurance plan and the dealer standing by his right to favor local business interests which favor him.

Commerce Bureau Head Was Tractor Salesman

WASHINGTON, May 15—R. S. MacElwee, nominated by President Wilson to succeed Philip B. Kennedy as Director of the Bureau of Foreign and Domestic Commerce, will be in a position to aid the export business of the American automotive industry. For three years he served in Germany as a demonstrator and salesman for American motor tractor plows and other equipment.

The new director is an authority on sales promotion, especially in foreign markets. He was appointed manager for an American Elevator Co., at its Berlin offices, after his experience as salesman for tractor equipment. During his long stay in Germany he devoted much time to engineering study, receiving a degree from the University of Berlin.

SWEDEN TO SHOW CARS

WASHINGTON, May 17—The Bureau of Foreign and Domestic Commerce has been advised that an automobile exhibition has been arranged in connection with the Norrland Fair, to be held at Sunsvall, Sweden, June 21 to 27. Consul General D. I. Murphy, at Stockholm, has requested that American manufacturers be present.

Industry Studies Gasoline Increases

Oil Producers Join Automotive Bodies in Effort to Control Situation

NEW YORK, May 18—With the wholesale price of gasoline advanced last week by the Standard Oil Co. to 30 cents a gallon, the highest in history, not only motorists but manufacturers and dealers are wondering what can be done to check the steady increase in the cost of operating automotive vehicles. The latest increase marks a rise of 6 cents in the last 4½ months. The upward trend of prices here will be followed in other parts of the country. The retail price here now ranges from 34 to 37 cents. A year ago it was 27 and 28 cents.

Still higher prices are predicted by the Bureau of Mines and there is growing discontent over the situation. Oil interests assert emphatically that there is no profiteering and they join with automotive interests in asserting that there is no basis for reports of "fifty cent gas" for this year at least. So far as can be learned nothing specific has been accomplished to solve the problem of mounting costs beyond efforts of refiners to produce a greater percentage of gasoline from crude petroleum.

A joint committee representing the Society of Automotive Engineers, the Petroleum Institute of America and the National Automobile Chamber of Commerce was appointed several months ago to devise means of approaching the fuel problem. H. L. Horning is understood to have prepared a report on fuel which will be read at the summer meeting of the S. A. E. at Ottawa Beach the last of June. Exhaustive experiments are being made by C. F. Kettering, the Bureau of Mines and others on both sides of the Atlantic with fuels which will be substitutes for gasoline.

Improve Refining Methods

The refining companies themselves are experimenting with new processes of extracting the maximum quantity of gasoline from crude oil. Meanwhile more and more of them are using the Burton and allied processes. There is no uniformity in gasoline production or in the gasoline content of crude oil. It is lowest in California, where the percentage does not exceed 12. It is highest in Illinois and Indiana, where it reaches 35 per cent; and on the Atlantic seaboard it averages 22 per cent.

In districts where the smallest amount of fuel is being obtained steady progress is being made in improving the showing. The fact remains, however, that the production of crude oil does not equal the refining capacity of the country. In 1919 it averaged approximately 1,000,000 barrels a day while the refining capacity is 1,250,000 barrels a day. This situation has resulted in a sellers' market for the producers.

Only three methods of augmenting the gasoline supply are recognized by the oil producers. One is uncovering new fields and constant efforts are being made in this direction. Another is increasing the percentage obtained from crude oil. The third is conservation. The producers hold that enormous quantities of gasoline are wasted by motorists, chiefly because of faulty carbureter adjustments.

It is contended by the oil companies that the driving power of the fuel sold to-day is as high as it ever was, although the specific gravity has materially decreased. They declare specific gravity has no bearing on the situation and that the boiling point is what counts in internal combustion engines.

The Petroleum Institute is directing its efforts, however, both at improving the quality and quantity. It has agreed to make for the N. A. C. C. an annual forecast as to the total production and average quantity of the gasoline refined in this country, but the date for preparing this forecast has not been set. It also has agreed to answer a series of questions to be submitted by the S. A. E. high running board apron is replaced by definitely formulated.

Promote Highway From Duluth to New Orleans

HAMMOND, LA., May 19—The Louisiana Division of the Mississippi Valley Highway Association has been organized here to aid in the construction of a hard surfaced highway, running from Duluth, Minn., to New Orleans, entering this state between Poplarville, Miss., and Bogalusa, La., and passing through the last-named city, Covington, Hammond, Pontchatoula and Kenner, thence into New Orleans.

The Mississippi Valley Highway is a hard-surfaced road, being constructed from uniform plans all the way, and will be completed in two years, enabling travelers from St. Paul, Duluth or Chicago to motor direct to New Orleans. Local clubs for the advancement of the project have been organized in Bogalusa, Hammond, Covington and New Orleans, as parts of the Louisiana division. W. H. Nalty of Hammond and J. K. Johnson of Bogalusa are the Louisiana state representatives. J. M. Fourney of Hammond is supervising engineer for the state, and G. C. Merkey of the New Orleans Association of Commerce has been made assistant to General Manager White.

NATIONAL BUYS SEARS-CROSS

NEW YORK, May 18—The Sears-Cross Co., Bush Terminal, Brooklyn, manufacturers of the Sears-Cross lock for automobile doors, has been purchased by the National Seal Co., Inc., with plants in Brooklyn and Portland, Me. Business expansion will follow the purchase. During the year the National Seal Co. will complete a new plant in Brooklyn for volume production of locks to meet the demands of motor car and body builders. The personnel of the Sears-Cross Co. will continue with the new organization.

Selden Truck Seeks Dealer Suggestion

Will Form Advisory Council to Counsel Construction and Selling Policies

ROCHESTER, N. Y., May 15—An advisory council has been organized by the Selden Motor Truck Corp. which will include one representative, dealer or salesman from each of the eleven districts into which the country is divided. The first meeting will be held some time in August. The purpose of the council will be to bring the dealer and manufacturer closer together. The corporation will give the members the right to advise on policies of construction and selling.

The council will meet in Rochester as frequently as necessary, all expenses being paid by the corporation. While the officers will be ready to confer with the representatives or assist them at their meetings, no officer from the president down will be permitted to attend the deliberations unless invited to do so. The meetings will be strictly of Selden dealers and their salesmen.

A novel plan has been worked out for election of council members. A certificate for 500 votes will be given every dealer or salesman who sells one of the new 1½-ton models. The men holding the greatest number of certificates in each district will be considered elected by the "primaries." The election proper will go on during June. Every salesman will have the right to say which one of the two men in his division will receive the benefit of the votes he can cast by the power of the certificates he holds. At the end of June the man having the highest number of votes in his division will be called as representative of that division on the council.

After the meeting of the representatives, there will be a session of division sales managers, to which all questions brought up at the council meeting will be referred for action.

METZ ENGAGES CLERGYMAN

WALTHAM, MASS., May 14—The Metz automobile plant will soon have Rev. J. P. MacCarthy, pastor of the First Parish Church, to take charge of the welfare department of the factory. Mr. MacCarthy resigned from the parish a few weeks ago. He will have entire charge of welfare work at the factory and it is believed that he will prove a good selection on the part of the officials.

HAS NO CONNECTION

NEW YORK, May 17—The American Bronze Corp. of Berwyn, Pa., manufacturers of Non-Gran bearing bronze, is in no way connected with any other company manufacturing bronze. This announcement is made to prevent confusion with a company of identical name incorporated in another State, against which bankruptcy proceedings have been started.

Motor Vehicle Statistics for 1919

Value complete car and truck output	$1,885,112,546
Value parts and accessories output	621,722,048
Value tire replacement output	660,000,000
Value tire sales to car mfg	165,000,000†

Motor Vehicles Produced — 1,974,016

Number cars	1,657,652
Number trucks	316,364
Per cent gain over 1918	71 %
Per cent exported	4.2%

Tire Figures

Tires produced for motor vehicles	33,000,000
Equipment business	6,600,000
Replacement	26,400,000

Total Passenger Car Output in 1919 — 1,657,652

Open cars	1,496,652
Closed cars	161,000
Per cent gain total car output over 1918	78.9%
Value of output	$1,461,785,925
Per cent of output exported	4%

Retail Passenger Car Business:

Passenger car dealers	32,245
Garages	36,227
Repair shops	43,643
Charging stations	4,587

Motor Truck Production in 1919 — 316,364

Per cent gain over 1918	39%
Wholesale value of output	$423,326,621
Per cent of output exported	4.9%

Commercial Vehicle Registration — 750,000

Number of states registering trucks separately	23
Largest state user, New York	119,918
Trucks on farms, approximately	100,000

Truck Dealers — 18,336

†Included under complete car and truck output.

German Cars Offered in British Markets

LONDON, April 30 (*Special Correspondence*)—Gradually it looks as though German motor firms will again find a footing here, for already both German cars and trucks are being advertised as imported by British firms, and the Bosch Magneto Co. is again represented in London. A number of German trucks were offered this week to firms in a provincial town at about $4,000, which is about 50 per cent less than trucks of British make of corresponding grade. It should be noted that the German Government (it is understood at the request of the British Government) have insisted on the German motor wares being marked up to the prewar rate of the mark, hence it is curious how or why these trucks can be offered at the price referred to. Magnetos are one of the items which cannot be imported without a special license, being declared a "key" industry.

STANLEY MILLS CONSOLIDATE

NEW BRITAIN, May 15—Two of the oldest manufacturing establishments in New Britain, which have grown and prospered side by side for almost seventy years, have been consolidated by the purchase by the Stanley Works of the Stanley Rule & Level Co. The Stanley Works now will operate a dozen plants where skilled mechanics are familiar with their particular requirements. They operate steel mills, rolling mills and foundries, as well as timber lands and saw mills to supply raw material.

French Chamber Gives Embargo Particulars

NEW YORK, May 15 — An official resume of the luxury embargo declared by France has just been made public here by the French-American Chamber of Commerce. That section relating to automobiles and automotive equipment was given out by the Chamber as follows:

Chassis, with or without engine, with or without body, weighing less than 2500 kilos (about 5500 lb.).

Bodies of motor vehicles weighing 2500 kilos and more for transportation of passengers.

Bodies for vehicles weighing less than 2500 kilos.

Chassis frames of flanged steel plate for motor vehicles weighing less than 2500 kilos.

Rims, except flat.

Automotive Business Over Three Billion

N. A. C. C. Statistics Show Wholesale Trade in 1919 to Be $3,166,834,594

NEW YORK, May 18—Tremendous forward strides in the automotive industry in 1919 are recorded in statistics compiled by the National Automobile Chamber of Commerce. They show that the wholesale business in motor vehicles, parts, tires and accessories reached the staggering total of $3,166,834,594.

More than seven and a half million cars are reconstructing America, one-third of the automobile owners are farmers. The greatest percentage of increase in registration has been found in the cotton growing sections of the South.

One man in every fourteen, in short, has passed the pedestrian or wagon stage of conducting his business, and is able to attend to his affairs with motorized efficiency. This figure is an average. Cars are not so thick proportionately in the cities, and their greatest density is to be found on the farms. The grain fields of Iowa and Nebraska are competing with the fruit valleys of California for the greatest number of cars in proportion to population.

Dixie really gets the palm of motordom this year, for the cotton belt has shown the greatest gains in registration. North Carolina has 51 per cent more cars than in the preceding year. South Carolina comes second with 45 per cent. Kentucky occupies fourth place with a gain of 36 per cent over her 1918 registration figures. The exceptional gain in the South is due to the fact that there have been heavy demands for cotton during the war and since.

New York heads the list in the tabulation of gross registrations, its figures for 1919 being 566,511. Ohio is second with 511,031. Pennsylvania third with 482,117, and Illinois fourth with 478,438.

Local vehicle manufacturers have had to break records to keep pace with the demand. There were 1,974,016 cars and trucks made in the United States last year, of which 316,364 were motor trucks. The increase in passenger car production was 78.9 per cent over 1918. This unusual jump was due to the fact that in the year previous the bulk of the motor car factories were heavily engaged in war production.

Progressive Year for Trucks

It has been a progressive year for the truck. The present registration of motor trucks is now about 750,000. New York State uses 119,918 commercial vehicles. Massachusetts registers 41,810 and Pennsylvania 40,893.

America has not been neglecting the export business while building up its home industries. Motor car makers sent 82,730 cars abroad during 1919. Of these 67,145 were passenger cars and 15,585 were motor trucks. This represented about 4.2 per cent of the total American automobile output for the year.

Commodity Rates Add Three Million

Twenty Per Cent Raise Under Proposed Classification Shown by N. A. C. C.

NEW YORK, May 14—A resume of testimony offered before the Interstate Commerce Commission at the rate hearings held here last week has been issued by the National Automobile Chamber of Commerce and emphasizes the important points of protest entered against the Commission's proposal to advance rates on various automotive and agricultural products from points east of the Mississippi to the Pacific coast. Further objections will be offered at continued hearings by the Commission in Chicago, Spokane and San Francisco during May. The following is quoted from the Chamber's statement:

"1. The freight bill on passenger cars and trucks shipped to the Pacific coast territory amounts to $15,000,000 per year, based on shipments in 1919, and the proposal to discontinue commodity rates on this traffic would add $3,000,000 per year to this sum.

"2. To justify this the carriers' attorneys and witnesses dwelt principally on the fact that automobiles and trucks are moved on class rates generally in all other territories; to indicate 'what the traffic will bear' they also alleged that Pacific coast dealers collect from the public more than the amount paid to the railroads for freight.

"3. We were able to show that the principle of applying commodity rates on self-propelling vehicles to Pacific coast territory dates from November 27, 1899; that shipments in 1919 amounted to fully 31,500 carloads and contended that the use of class rates for such a long haul would be unreasonable. It was also shown that railroad officials have conceded this principle in previous cases when the traffic was of much less volume.

General Advance Also Likely

"4. Railroad witnesses admitted that the proposed general advance in all freight rates throughout the country will be additional to these increases; we estimate this would amount to another $4,000,000 on Pacific coast shipments.

"5. We made it clear at the hearing that the industry is not only willing but anxious to join in a fair and equal proportion any general increase in freight rates that is found necessary to put the railroads in shape to furnish adequate service.

"6. On technical legal grounds attorneys questioned the authority of the Interstate Commerce Commission to issue an order in this proceeding except as to discrimination to inter-mountain territory."

J. S. Marvin, general traffic manager of the Chamber, was the principal witness at the hearings in New York and presented the figures relating to the annual amounts of automotive tonnage and freight charges. Testimony as to rates and shipping conditions at automobile plants was given by A. H. Nelson, Buick Motor Co., Flint, Mich.; A. J. Henderson, White Co., Cleveland; C. R. Scharff, Chevrolet Motor Co., New York, and O. H. Baughman, Winton Co., Cleveland. George N. Brown, until recently chief examiner of the Interstate Commerce Commission, appeared as attorney for the Chamber.

Grocery Tire Sales Increase in South

NEW ORLEANS, May 13—Distribution of automobile tires by wholesale grocers is spreading rapidly throughout the South. The manager of the tire department of the Albert Mackie Co., Ltd., of this city said to-day that several excellent branch lines had been extended through retail grocers in Louisiana and Mississippi.

The whole territory has been covered with advertising matter of all kinds, he said, and he added that an amazing number of motor car users were buying their tires of grocers. He added that he recently received a letter from a retail grocer who declared his tire business had grown so large he had decided to take on other automobile equipment and merchandise.

Haynes to Build Trade in Latin America

KOKOMO, IND., May 15—The Haynes Automobile Co. has begun an aggressive sales campaign in Mexico, Central and South America. Every important center from the southern boundary of the United States to the far reaches of Argentina will be visited to get dealers for the Haynes cars.

José A. Barros, formerly attached to the Brazilian consulate in Chicago and recently with the National City Bank in New York, has been engaged to form a dealer organization in South America where he was engaged in the automobile business for several years. Leland de Villafranca, at one time secretary of the Costa Rican consulate in Guatemala, will take up the same work in Mexico and Central America.

INVENTS SPONGE TIRE FILLER

ELGIN, ILL., May 17—Rubber Ace Co. has commenced the manufacture of a new type of a tire filler. The device consists of a sponge rubber inner section designed to fit casings of three to five inches. Tires for motorcycles and airplanes will also be supplied with the device. The inventor is Fred Lilley of Akron. It is claimed by the inventor that the filling will double the life of the casing. The inner tire is a solid filler made of sponge rubber, made by utilizing smoked rubber sheets, mixed in a milling machine with certain compounds. After a curing process the mixture is run into molds and vulcanized. Any size casing can be made by a system of wedges.

Factory Negligence Arouses Dealers

Repair and Replacement Work Credits Long Delayed—Assert Distributers Unfair

ITHACA, N. Y., May 17—Automobile dealers in nine counties of central New York are voicing indignation against manufacturers on two points. The first is a complaint of carelessness on the part of the factories in assembling cars for delivery, and the second is a rather widespread charge that the manufacturers are permitting their distributers to retain more than their rightful share of cars under the present shortage.

A representative of AUTOMOTIVE INDUSTRIES who visited a large number of dealers in this district found a good deal of resentment against factory methods. Some dealers pointed out that they were put in a position of decided disadvantage in being forced to pay for cars before they even see them, only to find when they are unloaded that work of an expensive nature, running anywhere from a few dollars to several hundred dollars, is necessary to put the machines in shape for delivery to customers.

Claims filed with the factories for allowances for completing or correcting assembly work not properly done at the factory, these dealers say, have met with little consideration in most cases. There has been trouble also, the dealers say, in obtaining from the factories credit for repair work or replacement of defective parts covered by the manufacturers' warranty. Several dealers report losses of some importance through having to make good with customers on car defects.

The few distributers in the larger cities hereabouts deny any retention of more than a fair share of cars coming on from the factories, but the story persists among small town dealers, some of whom have not had more than two or three cars and others none at all since the first of January, that the distributers are worrying about their own overhead charges first and about the dealers' afterward. Whatever may be the truth of the situation it is apparent that the issue of discrimination is going to be brought to the attention of manufacturers as against distributers.

Trade Outlook Good

General conditions in the territory are favorable to a thriving business in automotive products. Farmers are prosperous, so much so that one banker remarked that he would rather have a farmer's paper than his cash. Small city and small town manufacturing plants are booked far ahead on orders and commercial activities are booming. Cars are selling ahead of demand, light trucks are moving rapidly but the heavier, high grade trucks rather slowly onto farms and into commercial and industrial establishments. The demand for tractors is fully as good as could be looked for in a territory where farm acreage hardly ever averages over 100.

Bankers Take Over Allen Management

Refinancing Plans Agreed to by Stockholders — Board of Directors Resigns

COLUMBUS, May 17—Stockholders of the Allen Motor Co. of Columbus have adopted the refinancing plan as worked out by a committee of Columbus bankers. When the plan is worked out the corporation will be placed in a much stronger position than at present and plans for increasing production will be carried out.

Under the plan 14,817 shares of common stock of $100 par value will be retired and 300,000 shares of no par value will be issued. Plans have been made to sell 100,000 shares of this stock for $700,000, which will be put into the business after paying off the original common stock. The reorganization plan also contemplates the issuance of $1,000,000 of 7 per cent serial notes secured by first mortgage on the plants. This is to give additional capital after outstanding claims are paid off This issue of notes is to be returned at the rate of $100,000 every six months, which will make the loan run to five years.

The bankers committee is composed of F. R. Huntington, W. C. Willard and George E. Archer. Embodied in the plan is the resignation of the 15 directors of the company, to give the financing committee full control of affairs. The resignations have not been accepted, but plans are now being made for a meeting of stockholders to elect a new board. Present officers are E. W. Allen, president; W. O. Allen, vice-president; George E. Schroth, secretary, and H. C. Runyon, treasurer. C. R. Miller is general manager.

The plants in Columbus and Bucyrus, Ohio, are being operated on full time. Previous to the switchmen's strike the Columbus plant turned out about 30 to 35 cars daily while the Bucyrus plant manufactures about 1000 motors and transmissions monthly. Under the plan the total capitalization of the company will be $1,000,000 notes; $1,100,000 common stock and $530,000 preferred stock.

TRUCK PRICES ADVANCE

CHICAGO, May 18—The All-American Truck Co. has increased prices, f.o.b. on wheels at factory, effective May 1, as follows: One-ton, from $1,495 to $1,795; one and one-half-ton, from $1,895 to $2.195; two and one-half ton, from $2,195 to $2,395.

TRUCKS SUPERSEDE CANALS

NEW ORLEANS, May 17—Owners of the five navigable canals entering New Orleans over which, since time before the Civil War, fish, shellfish, poultry, game and farm produce have been transported from the distant rural districts on schooners and power freighters and small steamers, to the markets of the Crescent City, are in a quandary as to just what their prospects are. In two or three instances good roads have been built paralleling these canals, and motor trucks operated on these highways have almost immediately put the boat lines out of business. The canal owners cannot oppose the construction of improved roads without laying themselves open to opposing the state's best interests, yet they see their canals becoming useless within a few months after the opening of such highways.

Rolls-Royce Plant To Start in June

SPRINGFIELD, MASS., May 18—Progress is being made rapidly in getting the automobile plant of the Rolls-Royce Co., formerly the factory of the American Wire Wheel Co. here, in readiness for operations and work soon will be begun in the actual building of chassis. Workmen are now busy in the manufacture of small tools, dies, jigs and fixtures. Officials at the plant state it is now believed that actual work on the first American-built chassis, which will be an exact duplicate of the English model, will be begun in two weeks.

Machinery from England is being received and installed. Skilled workmen from the home plant are busy in assembling it and large quantities of raw materials are being prepared for actual work. Officials of the company report that about 200 skilled mechanics have thus far been employed but it is planned to increase this number to about 1000 as soon as production warrants it. It is also planned to increase production from month to month, as rapidly as possible. No difficulty is reported in securing workmen.

Palace to Pass as New York Show Site

Owners to Change Structure to Business Building After 1921 Show

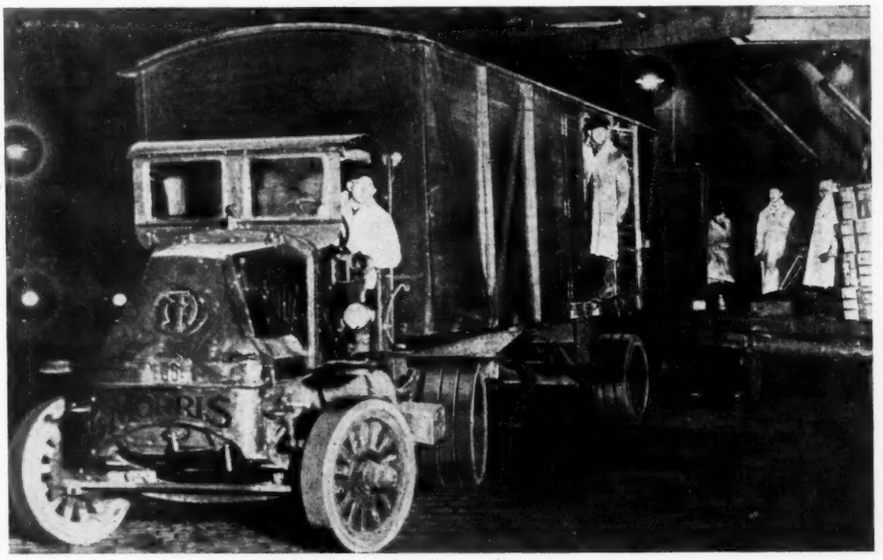
NEW YORK, May 17—No automobile expositions will be possible in Grand Central Palace after the 1921 show, if the organization headed by Alfred I. du Pont, which owns the building, carries out its plan to convert the structure into a business building. Since 1912 the Palace has housed practically all of the big expositions in this city.

With its four exposition halls Grand Central Palace afforded a larger area of floor space than any other auditorium in the city, not excluding Madison Square Garden. The latter place, suitable for many of the events held in Grand Central, is mostly occupied with sporting events, making it difficult to obtain for exhibitions or conventions.

When the leasehold of the building was taken over by the du Pont organization it was announced that the building would be used as a great market place for domestic buyers under the name of the International Exposition of Industries. Since that time the demand for space for business purposes is believed to have led the leaseholders to change their plans.

Originally it was planned to change the character of the building dating from Jan. 1, 1920. Protests caused this to be abandoned but notices have now been sent out by Frederick W. Payne, manager of the building, saying this plan would be carried out, dating from April 1, 1921.

Huge 15-Ton Refrigerator Tractor-Trailer



The railroad tie-up was the immediate cause for the development of this type of tractor-trailer. The illustration shows a Morris & Co. vehicle leaving the stockyards in Chicago bound for Racine, Elgin, Aurora, Gary, Waukegan, Kenosha and other cities in that territory. More than a million pounds of meat was delivered in this way during the strike

Nation Will Mobilize Motor Trucks

Automotive Industry to Meet Emergency

War Department Calls Council of National Defence to Outline Operations

WASHINGTON, May 19—With the railroads unable to meet the insistent demands of shippers, the United States Government through the Council of National Defence has turned to the automotive industry for relief. Called into special session yesterday by Secretary of War Baker, the council drafted several tentative plans for the mobilization of all motor trucks and motor vehicles to meet the emergency.

Statistics submitted by the War Department showed that 21,144 serviceable army trucks are available, making a grand total of 45,000 Government-owned trucks prepared for eventualities. Questionnaires sent out by the Council of National Defence list approximately 700,000 privately owned trucks, supplemented by more than 7,000,000 passenger cars.

Officials of the American Railway Association have been in daily conference with the Federal Highway Council and the transportation section of the Council of National Defence since the crisis became acute. The question of mobilizing these trucks at various terminals where foodstuffs are now held up by traffic congestion was thoroughly discussed. The proposed plan of the Motor Transport Corps mapped out when the switchmen strike was called last month has been revised to meet the present situation.

The Motor Transport Corps has disposed of 98 per cent of the 39,000 vehicles, the sale or transfer of which recently was authorized by Congress. The House passed a bill yesterday authorizing the Secretary of War to transfer 500 ten-ton caterpillar tractors, 200 mobile machine shop units complete with spare parts and shop machinery to the Department of Agriculture. These tractors will be distributed over the country wherever they are required for highway construction.

APRIL DRIVE-AWAYS, 51,599

NEW YORK, May 19—Figures for the month of April received by the National Automobile Chamber of Commerce show that in that month the factories of the country shipped 12,674 carloads of automobiles by rail and drove away 51,599. This compares with 23,860 carloads shipped in March and 49,778 driven away. It offers a speaking commentary on the inadequacy of the railroad transportation provided the industry.

Serving the Nation, the Industry and Himself

Despite the handicaps due to transportation and other difficulties, a motor truck manufacturer in the Middle West during the month of March gave to the country 32,475 ton miles of transportation.

The company makes a 1½-ton truck. Its schedule for March was 430. But when the production was totaled at the end of the month the schedule had been exceeded by three trucks.

An investigation was made to find why the profits for the month were about a third less than normal. The reason was soon found. The third of the profits had been used in motor truck transportation, getting for the plant the materials with which to work. And—without this extra expense there would have been a minimum of production and no profits at all. It increased costs but kept the business going.

Not the least in importance is the fact that the production of this amount of vehicular transportation was a distinct national service at this time.

Besler Expresses Value of Truck Transportation

NEW YORK, May 18—That there is no disposition on the part of the railroads to discredit the services given the country by motor trucks is evidenced by the following statement contained in a letter sent by W. G. Besler, president of the Central Railroad of New Jersey, to F. W. Fenn, manager of the Motor Truck Division of the National Automobile Chamber of Commerce:

"There can be no question in the mind of anyone concerning the important part the motor truck has come to play in the matter of transportation in this country, nor that it has come to stay and to supplement railroad service just as the automobile and trolley car have supplemented and extended the radius of suburban life.

"The auto truck for intra-city movement and for inter-suburban service will fill a much-needed gap and will do more economically and efficiently the less than carload lot business which has been forced upon the railroads and must be handled through transfer houses."

Similar sentiments have been expressed by other rail executives.

Trucks Placed Near Head of Essentials

Will Be Favored in Freight Priority—Passenger Cars Top Non-Essentials

WASHINGTON, May 19—Specific orders from the Interstate Commerce Commission covering the distribution of freight car equipment are expected this week. Issuance of a priority list with motor trucks high among the list of essentials and passenger cars topping the non-essential column is anticipated by traffic officials.

Representatives of the automotive industry have been presenting a stiff opposition to any plan which would place the industry at a disadvantage. Their arguments about the employment situation and the increasing demand for transportation facilities apparently are carrying more weight than they did during war time.

Alfred Reeves, general manager of the National Automobile Chamber of Commerce, has sent word to all manufacturers to organize to meet the car scarcity. The possibility of cars being refused for several weeks or while the emergency lasts presents a serious situation to the plant managers, especially the traffic departments with heavy delivery orders on the books. Reeves stated today that 51,000 cars, 20 per cent of the total production for April, were moved away from factories under their own power. This was an increase of 1000 over March. With improved weather the figure may be exceeded this month.

The chief concern of the factories now, Reeves said, is the problem of obtaining materials. Purchases may be completed but the transportation situation prevents deliveries at automobile plants. He has taken this question up with members of the Interstate Commerce Commission in the hope that these materials may be given a fair rating on the priority list on the ground that this is no more than fair since the finished product will be driven away.

I. C. C. Studies Congestion

The Interstate Commerce Commission has directed its inspectors to report on conditions at all terminals where congestion exists. They have found that the unfavorable labor situation and a shortage of man power are the principal causes of the present freight jam. The commission has authorized movement of empty box cars suitable for grain from the East to Middle West and Western points. Box cars originally destined for automobile factories now have been taken over for other uses.

Manufacturers Radiate Optimism

Few Cancellations Found in Detroit

Factories Report Sustained Demand Despite Credit Curtailments

DETROIT, May 19—Automobile manufacturers are exerting every energy to meet the clamor of dealers all over the country for cars. Although they are working under a very serious handicap because of the freight situation they absolutely refuse to be pessimistic and are facing the future with serene confidence. They are having no end of trouble with production, however, and this month's figures will show a deficit of from 20 to 40 per cent in the production schedule for May and an even greater decline compared with March.

No one pretends to be able to forecast the future and conditions even for tomorrow are problematical. All the larger factories have most varieties of steel and other materials on hand to last them 60 days. A steel embargo or diversion of all steel to the railroads would mean, however, a shut-down within ten days. But that condition is not expected and leading manufacturers insist it is beyond the bounds of possibility. They assert the steel makers would not have the audacity to single out for discrimination an industry of such magnitude.

At the same time automobile manufacturers have expressed a willingness to make whatever sacrifice may be necessary in favor of the railroads if the same attitude is assumed by other industries.

Force Reduction 15 Per Cent

The shortage of materials and the consequent curtailment of production has resulted in the cutting off of employees in every plant but a careful survey of the situation shows an average reduction of not more than 15 per cent and this includes every factory in Detroit and adjacent territory. All the plants in Detroit and a majority in the state are dependent on the Edison Power & Light Co. for power and as yet President Dow of the company has given no intimation of any curtailment in the supply. Normal power has been supplied since the shut-down in April because of the coal shortage which would indicate that ample supplies of fuel are being received.

One of the best indications of the healthy condition of the industry is in the lack of cancellations of orders. Reports had become current in other cities that dealers all over the country were cancelling orders but statements of five of the larger manufacturers in Detroit are in direct contradiction to these rumors. It is true that there is a cancellation here and there but in almost every instance it comes from a district where the banks have shut down on automobile credits and they are not sufficient to cause even a ripple on the surface.

The same five manufacturers said today they were making cars as fast as they could in the face of the material shortage and declared there were a dozen requests for every automobile now being made. The dealer naturally is the man hardest hit by the attitude of the banks. This condition is in effect only in spots.

Retail Credits Curtailed

Detroit banks have cut down on automobile loans to dealers because a large percentage of the cars sold here are disposed of on a credit basis. Naturally the bankers' action worked a serious hardship on the dealers but they have not run up the white flag. They declare they can handle their allotments on a cash basis. There is no dealer who does not hold orders and cash deposits for delivery of cars. One of the largest said to-day he had $20,000 in the bank in $100 deposits from customers who are ready to pay the balance as soon as the cars can be furnished. This dealer, who handles a car selling around $1,200, said the orders would cover every car he could get between now and Aug. 1.

Dealers in the Kansas City, Richmond and Atlanta Federal Reserve districts are confronted with a similar situation, but it is probable there is no city in the country where as many cars are sold on credit as in Detroit.

One of the results of the production curtailment here has been to give opportunity for factories to rid themselves of unsatisfactory employees and to keep the good ones. It is asserted that no competent, loyal and willing worker is idle in Detroit to-day. That applies not only to the automobile industry but to every line.

French Tire Plants Closed to Strikers

PARIS, May 4 (*Special Correspondence*)—Michelin has shut down his tire factory at Clermont-Ferrand, throwing out of work 12,500 men. The Torrilhon tire factory in the same town has also closed, while Bergougnan is working with only 75 per cent of the normal number. This lockout in the French tire capital is due to labor disturbances in which it was asserted the authorities failed to provide adequate protection to the manufacturing interests.

A strike of chemical workers in Paris has affected the Goodrich tire factories, the Dunlop & Palladium tire works and the Hutchinson tire factory. The Desmarais oil refining works are closed down and the Lille-Bonnieres gasoline and oil refinery is partly closed. Demands by strikers are for increased wages and recognition of their unions.

Credit Curtailment Not to Stop Wheels

Federal Reserve Adopts Constructive System to Bring Deflation —Ends Speculation

WASHINGTON, May 19—Curtailment of credit expansion without demoralization of industry is contemplated in the program adopted at a two-day conference between the Federal Reserve Board, the Federal Reserve Advisory Council and the directors of Class A Federal Reserve Banks. The session ended last night with the country's foremost financiers manifestly encouraged at the improvement in liquidation and proposed methods of bringing about stabilization.

Instead of promulgating a general mandate against making loans to certain classes of business enterprise, the conference unqualifiedly indorsed the proposal of Governor Harding of the Federal Reserve Board to permit the local bankers to exercise discretion in application for credits. The bankers in each community will thus determine the character of the loan and the advisability of granting credit. The board has only advised against loans intended for purchase of luxuries or for obviously non-essential purposes.

After several conferences with bankers who participated in the conference, Alfred Reeves, general manager of the National Automobile Chamber of Commerce, found that the automotive industry would share with other enterprises in the general curtailment. The extent to which the new policy will affect the industry cannot be determined at this time. Reeves and Pike Johnson of the same organization; Harry G. Moock, manager of the National Automobile Dealers Association, and A. L. Viles, manager of the Rubber Association of America, sounded out the opinion of the conferees whenever possible. All rumors to the effect that the Federal Reserve Board would direct attention to the automobile industry particularly were discounted. No industry can consider itself exempt from the new financial policy.

No Change in Procedure

The deliberations, by far the most important financial conference in recent years, ended without changes in the procedure of the Federal Reserve Board or banks. No revision upward of discount rates is expected at present. The conference was of the opinion that the *transportation situation was largely responsible for credit expansion.* It appointed a special committee which conferred today with the Interstate Commerce Com-

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Trucks and Tractors Not Under Embargo

French Restrictions Bar All Passenger Cars, Parts and Equipment, However

PARIS, May 1 (*Special Correspondence*)—Automobile imports into France are forbidden from the present date. The restriction applies to all motor vehicles whether in chassis form or equipped with body, if weighing less than 5511 lb. It also shuts out steel and iron rims for motor cars, automobile tires and all rubber goods, motor boats and other river craft, airplanes, airships, flying boats and balloons.

Under this restriction it will be possible to bring trucks and agricultural tractors into France, but nothing whatever in the nature of a passenger car. Although the regulations are not very clear, it would appear that spare parts can be imported if not used for assembling into complete vehicles. This, therefore, puts an entire stop to the Ford activities in France, for this firm imports parts and assembles them at the Bordeaux factory.

It is certain that the immediate effect of this new regulation will be to increase the already high price of cars in France. Manufacturers generally were considering the question of an increase, but now that restrictions have gone into effect they will certainly take this step. As an indication of the high prices prevailing, the 4-seater 10-hp. Citroen is retailed at 18,000 francs, or nominally $3,600; the 12-hp. Renault chassis, which is the cheapest model Renault makes, is sold at 21,000 francs, or nominally $4,200.

The regulation, which has been expected for several weeks, is declared to be an attempt to reduce the present high rate of exchange with America and Great Britain. On the French market the dollar is now worth between 16 and 17 francs, while the value of the English pound sterling is around 65 francs. The Government has included 140 articles in the forbidden list; most of these are of a luxury nature, but there is a certain number of really necessary goods.

The project is also under consideration to limit the imports of gasoline and to institute gasoline tickets for all car owners, as during the war. It is not yet known whether the Government will give effect to this proposal, but in official circles it is declared that very vigorous action will be taken to get exchange to a more reasonable basis, and that the public must be prepared to submit to some inconvenience in order to attain this end.

DAIL PRODUCTS BUYS STEEL

LANSING, MICH., May 14 — Ernest Dail, general manager of the Dail Steel Products Co., closed a deal recently for a large tonnage of Government steel for his factory. The steel which was destined to be made into Eagle boats at the Ford plant was placed on the market by the Government some time ago, and Dail took advantage of the opportunity to purchase it. The steel was fabricated in the mills and shipped to the Eagle plant during the war with holes drilled ready for assembling. The Dail company, however, will shear the steel so that little waste will result on account of the holes. Dail executives declare the steel arrives at a time when the shortage gave rise to fear that the plant would have to cut production materially until the steel mills had returned to normal production.

Credit Curtailment Not to Stop Wheels

(*Continued from page* 1187)

mission and the Shipping Board on plans to relieve the congestion.

The question of shutting down on loans was the absorbing topic of the conferences. The bankers agreed to a plan for the investigation and classification of all paper held in their portfolios. They will segregate this paper with special attention to the class regarded as speculative or contributory to profiteering. Explicit orders will be issued to refuse all applications for renewals on speculative paper.

Reports submitted to the conference showed a tendency on the part of some banking interests serving other industries to single out the automotive branch for criticism. It was represented to the conference that the automotive trade had by reason of unusual wage inducements weaned skilled workmen from other fields. It was said that sentiment had developed in many quarters against the extension of loans to the automotive representatives who are bidding for labor. The contention in these cases is that credits to a particular industry which intended to bid high for labor and materials is decidedly detrimental to other industrial organizations.

An agreement as to procedure to loosen goods tied up in transit or held in storage for large profits was reached. The banks will scrutinize all paper of this type in order to reduce credits.

No ironclad rule has been adopted in regard to essential credits. It was evident, however, that the board favored a policy of gradual contraction. They will sanction lending more money to complete production, insure delivery and costs. In fact, it is understood approval would be given for extension of credits in a particular unit which may later be refused credit. The object of this proposed plan is to complete production rather than face a loss.

FENN ON MICHIGAN TOUR

NEW YORK, May 18—F. W. Fenn, manager of the motor truck division of the National Automobile Chamber of Commerce, left last night for Ann Arbor to join the motor truck tour which will end in Detroit Thursday night with a big dinner at which he will be the principal speaker. From Detroit, Fenn will go to a few of the factories and then to Indianapolis to attend the convention of service managers next week.

Export Shipments Forsake New York

Port Congestion Results in Heavy Diversion, in Some Cases Permanent

NEW YORK, May 19—Diversion of cars, trucks and automotive equipment for export shipment from New York to other ports has assumed large proportions during the last few days because of the congested rail and port conditions. Exporters literally are going to extremes to place their products on board ship and are facing the costly problem of probable drive-aways for all their movements of cars to the embarkation point.

Philadelphia, Boston and Montreal are the chief ports being used instead of New York. Gaston, Williams & Wigmore, an exporting firm which handles a large line of automotive products, has diverted practically half of its shipments to Philadelphia, using whatever service it may find there. Ford is shipping through Philadelphia, Boston and, as was said by Ford officials "anywhere we can find facilities." Wonham, Bates & Goode, Inc., is using Montreal for many shipments to all parts of the world and the routing of their lines there has reached heavy proportions.

The condition is one that has changed rapidly and reflects the situation in the shipping world. Cargo space on steamships is not lacking, the difficulties being placement on board the ships. The Ford company, shipping from its assembly plant in New Jersey, has diverted as high as 40 to 50 per cent of its output, although this percentage is higher than the average. In a few instances it has trucked its export material to Philadelphia from here.

The diversion was brought about purely as a shipping expediency and some of the firms expected to resume all their shipments from New York when normal conditions are again restored. Other companies were satisfied with the change and said it probably would be permanent.

In the event of a railroad embargo, most of the local exporters are ready to undertake drive-aways, although feeling that the high cost of such movement would wipe away or greatly reduce their profit percentage.

WOULD CHANGE TRUCK ACT

TORONTO, May 15—Use of pneumatic tires on motor trucks has resulted in a movement for the amendment of the proposed Ontario load of vehicles act. Data has been submitted by the Ontario Motor Truck Owners Association to show that in few cases does the load of a truck with pneumatic tires exert as much pressure per square inch on the surface of the road as a heavy passenger limousine. For this reason it is argued that pneumatic tired trucks should be exempted from the provision which would limit the load of trucks to one-half their rated capacity in the months of March and April as a highway conservation measure.

INDUSTRIAL NOTES

Armstrong-Emley Crankless Engine Co., Jacksonville, Fla., is establishing a temporary plant for the manufacture of its engine for automobiles, farm use, motor boats and airplanes. The company has leased 8500 ft. of floor space and will employ 300 men. Production will be under the direction of J. E. Emley, inventor of the engine.

Sparks-Withington Co., Jackson, Mich., is occupying its new four-story storage building, a novel feature of which is that a siding runs to the second floor, facilitating loading of goods. The second floor of the radiator plant also is completed, giving 18,500 more feet of floor space.

Curtiss Tire & Rubber Co., Muskegon, Mich., whose plant was destroyed by fire last week, is pushing plans for rebuilding the plant on a more extensive scale. The new plant is expected to employ 500 men as against 175 employed in the plant which was burned.

Standard Motor Truck Co. was unable to operate at more than 50 per cent of its normal production in April because of the railroad situation and since May 1 has been working on a 40 per cent power basis to comply with local fuel regulations.

Racine Mfg. Co., Racine, Wis., is building a new battery of dry kilns which will provide a monthly output of 750,000 ft. of dry lumber. Other additions will also be made.

J. I. Case Plow Works Co. reported an output of 698 tractors in March, with the largest number of plows and other implements ever shipped in a month.

O'Bannon Corp., West Barrington, R. I., manufacturers of coated fabrics, has been cited by the War Department for meritorious service during the war.

Waukesha Brass Foundry Co., Waukesha, Wis., is rushing work on its new plant. The output of brass castings will be greatly augmented when completed.

Whitney Tractor Co.—Recently chartered at Upper Sandusky, O., with $1,000,000 capital, has taken over plant of Ohio Mfg. Co., to manufacture tractors.

Smith-Springfield Body Co., West Springfield, Mass., has received a contract to build 700 bodies for the Stevens-Duryea Corp.

Rotary Tire & Rubber Co., Zanesville, Ohio, is planning to increase its capital stock from $800,000 to $2,000,000.

H. J. Koehler Motor Corp., formerly located at Newark, is now installed in its new plant at Bloomfield, N. J.

Union Motor Car Co. will erect a plant at Eaton, Ohio, for the manufacture of automobiles.

Belmont Motors Corp., Lewiston, Pa., is making extensive improvements to its plant.

MENGES TO BUILD TRUCK

GREENVILLE, MISS., May 17—The Menges Motor Co., with an authorized capitalization of $1,000,000, has been organized here, with B. B. Payne, president, and J. E. Foster, secretary. The new company plans the manufacture, at a plant now being erected in Greenville, of the Menges truck, of which A. C. Menges of Memphis, Tenn., is the inventor and designing engineer. He is first vice-president of the company.

LAKE MAKES SMALL ENGINE

MILWAUKEE, May 17—The Lake Motor Co. of Milwaukee and Appleton, Wis., a $60,000 corporation organized several months ago, has placed in quantity production a line of gas engines designed for application to motorcycles, cycle cars, tractors, railway crew cars, electro-generating units and various other purposes. Until a plant is erected and equipped, the company is contracting for its output, castings being furnished by the gray iron foundry at Milwaukee formerly owned by the Universal Machinery Co., and the machine work and assembling by the Appleton Machine Co. of Appleton. The initial output is 50 engines a day.

Columbus Awarded 1921 Tractor Show

CHICAGO, May 19—Only one national tractor show will be held in 1921 and Columbus, Ohio, has been selected as the site. No date has yet been set but it probably will be held soon after Jan. 1. In scheduling only one show the National Implement & Vehicle Association changed its plan to hold four sectional shows in 1921, and gives the existing economic and industrial situation as the cause impelling the change.

Finley P. Mount, chairman of the show committee, in explanation said: "With a shortage of materials existing and the present freight congestion the holding of four sectional shows would impose too great a financial burden upon manufacturers, especially the smaller ones. A mail vote showed 32 out of 43 manufacturers in favor of one show under the circumstances."

Columbus was selected over Chicago, Minneapolis, Kansas City and other central cities because of the greater facilities for adequately housing the exhibit. Los Angeles and Western cities were held inaccessible to most manufacturers. The Los Angeles local show was voted the support of individual manufacturers, however.

EXPAND FOREIGN BUSINESS

NEW YONK, May 17—Announcement has been made of the establishment of the Wonham, Bates & Goode Trading Corp., with offices at 17 Battery Place, through the joint action of Wonham, Bates & Goode, Inc., and E. Naumburg & Co., both of New York, and M. Samuel & Co., Ltd., of London. The newly formed company will seek to enlarge and expand the foreign business of the former Wonham concern. Affiliation with the Samuel company will greatly enlarge the foreign connections of the American concern. Automotive equipment will be one of the products to be pushed.

COOPER-HEWITT TO EXPAND

HOBOKEN, N. J., May 18—To meet the increased demand for industrial lighting outfits as well as motion picture apparatus, the Cooper-Hewitt Electric Co., controlled by the General Electric Co., has purchased adjoining property which eventually will double its floor space. Rapid progress has been made in the development of the Cooper-Hewitt lamp, especially in standardization of the new power factor outfit.

METAL MARKETS

Pig Iron—What activity has been noted in the market for foundry irons in the last few days, consisted of small tonnage sales. Foundries in the automotive industries have been buying odd carloads on the basis of $45, valley or Buffalo. Pig iron sellers have been too much impressed by the contraction in output and not enough by the corresponding curtailment in consumption to suit buyers who might be tempted to take a chance on third quarter deliveries if anticipation of their requirements met with even a semblance of concessions. As matters stand, those who need a carload for quick delivery, will pay whatever they have to, in order to secure it speedily and as to future wants, they appear to be willing to rely on the general readjustment of commodity prices, sitting just as tight as sellers for the present.

Iron and Steel—Considerable impression has been made on the steel market by suspensions of orders from automotive manufacturers and it is frankly conceded that these suspensions may eventually result in cancellations. Automobile demand for hot rolled and cold rolled strip steel is reported to have fallen off considerably. On the other hand, there are reports of a number of automotive purchasing agents having entered the market for small tonnages of sheet bars which they will have converted into automobile sheets. A sale of 7,000 tons of Bessemer sheet bars at $75 is mentioned in this connection and negotiations for a quantity of open-hearth sheet bars at $90 for conversion into automobile sheets are said to be pending. For their own account sheet makers would hardly pay such prices. In spite of spasmodic transactions at fancy prices paid, as a rule, to insure extraordinary efforts to get the material to the consumer, the trend of the steel market is downward.

Aluminum—Although some resellers and brokers continue to quote virgin ingots, 98 to 99 per cent pure, at below 33 cents, they frankly admit that neither domestic nor imported metal can be had from first hands below that level. The quality of material offered at less than 33 cents is therefore open to doubt and vigilant scrutiny advisable.

Copper—Exports to France on three and four months' credit are used as a peg to impart to the market an appearance of strength. From the consumer's point of view, they emphasize, however, the continuingly heavy surplus to lessen which, producers are compelled to make concessions abroad, the demand here being dormant for the time being. After June 1, producers believe, some domestic consumers will have to resume buying. Producers' quotations of 19¼ to 19½ cents for electrolytic are offset by resellers' quotations of 18⅜ cents.

Tin—The foreign markets are apparently settling down to a basis equivalent to the 55 cents level here. One day there is a swing upward which will bring the price here to around 57 cents but on the following day the return to the lower level sets in.

NO DROP IN CAR PRICES

OMAHA, May 19—Press reports which stated that prices of automobiles had been cut in Omaha along with those of merchandise were misleading. They were based on an announcement by Pelton, the Franklin dealer, that he had on hand several Franklins bought prior to the recent advance and that he would sell them at the old price.

Automotive Financial Notes

. **Sewell Cushion Wheel Co.,** in support of a new stock issue reports net earnings in 1919, after deductions, except Federal taxes, of $119,041.85. Net earnings before taxes for the first three months of 1920 were $50,000. Current assets of $718,675.99 include cash $264,671.05 and merchandise $201,463.77. Land, buildings and other permanent assets are $436,457.62. Current liabilities are $293,047.10. Surplus is $286,794.32, and reserve for Federal taxes on 1920 profits and for dividends is $23,154.67. Of the authorized capital of $500,000 preferred and $500,000 common, $250,000 of the former and $282,000, of the latter is outstanding.

Stewart-Warner Speedometer Co. Stockholders will vote June 4 on a proposal to increase the authorized capital by the addition of 200,000 shares of no par common. It is planned to exchange 60,000 shares of the new stock for an equal number of no par common stock of the Stewart Manufacturing Corp.

Russell Mfg. Co. The stock of the company will be increased from $900,000 to $2,000,000 following action taken by stockholders. Stock will be issued to holders of record May 10 in the proportion of two new shares for three of old. The first increase of 66⅔ will be by stock dividends; the other $500,000 will be issued at par.

Stromberg Carbureter Co.'s annual report shows that more than $1,000,000 brought into the treasury through a capital increase did not become available until Oct. 1919, and is being employed in construction work that will double the productive capacity of the plant.

Keystone Tire & Rubber Co. The report for the year ended Dec. 31 shows a net income of $745,903. The total assets of the company are fixed at $5,813,501, the surplus at $1,214,640, and the gross liabilities at $4,598,861.

Hamilton Motors Co., Grand Haven, Mich., has increased its capital from $500,000 to $1,500,000. The increased capital was subscribed by Adolph Pricken, a real estate operator who has been elected president of the company.

Selden Truck Co. Earnings for the first quarter of 1920 were $158,557 after deduction of taxes. This was at a rate of $17 a share on the common stock. Employees of the company recently have purchased common stock at $50 a share.

Timken-Detroit Axle Co. has declared a regular quarterly dividend of 4 per cent, and an extra dividend of 2 per cent on common stock, both payable May 15 to stockholders May 10.

Packard Motor Car Co. Shareholders will meet May 24 to approve increase in stock for payment of stock dividend and for the conversion of debenture notes which may be issued.

Gillespie Aircraft Co., Boston and New York; has been formed with a capital of $1,000,000. The incorporators are Tillman B. Gillespie and John F. Gillespie of Cambridge and Howard F. Norman of Newton.

Michigan Drop Forge Co. directors have declared a quarterly dividend of 25 cents a share and an extra dividend of 50 cents a share, payable June 1 to stockholders May 15.

White Motors Co., in its report for 1919 shows assets aggregating $40,253,436 and surplus of $7,879,056, a surplus increase of approximately $1,000,000 over 1918.

B. F. Goodrich Co. Sales in March were at the rate of $220,000,000 a year. Current sales are running at a rate of 55 per cent greater than those of last year.

Air Friction Carbureter Co. The capital of the company has been increased from $60,000 to $250,000 to permit of construction of factory buildings and extensions.

Allen Tire & Rubber Co., Allentown, Pa., has increased its capital stock from $1,000,000 to $2,500,000 with which to finance additions to its plant.

Automobile Visor Co., has been incorporated in Delaware with a capital of $50,000 to manufacture automobile devices.

Premier Rubber & Insulation Co. has asked approval of an increase in capital stock from $150,000 to $250,000.

Service Record Meter Co. Incorporated as a Delaware corporation with a capital of $200,000.

Storage Battery & Electric Co., has been incorporated in Delaware with a capital stock of $25,000.

Ohio Crank Shaft Co. Incorporated with a capital of $100,000 to make crankshafts.

Haynes Automobile Co., has increased its capital stock from $2,500,000 to $4,000,000.

Biddle Motors Bought by New Syndicate

NEW YORK, May 18—The Biddle Motor Car Co. has been purchased by a syndicate headed by Stephen N. Bourne, formerly secretary of the United States Shipping Board, Emergency Fleet Corp. The Biddle cars were made in Philadelphia up to about a year ago, when the plant was moved to this city.

Associated with Bourne in the purchase are Walter H. Lippincott of Philadelphia, Myers Fitler, G. H. Stetson, the hat manufacturer; Wilson Potter, Van Horne Ely and H. C. Maibohm, president of the Maibohm Motors Co. The new interests are preparing to enlarge the factory to provide for an annual production of 1200 cars. The capital stock of the company has been increased to 200,000 shares of no par value, of which 100,000 shares will be sold.

BODY COMPANY REORGANIZES

FORT WORTH, TEX., May 18—Reorganization of the Fort Worth Wheel and Body Co. has been effected here with the election of new officers and a new board of directors for the current year. The following comprise the list of both officers and directors: R. H. Kimsey, Jr., president and general manager; E. C. Madal, general superintendent; R. E. Buck, secretary-treasurer; A. C. Camp, vice-president, and E. R. Vernon, vice-president. All the officers also serve on the board of directors.

BEST INCREASES STOCK

SAN LEANDRO, CAL., May 12—Because the business of the Best Gas Tractor Co. has grown beyond the limit of present facilities, $1,250,000 of cumulative 7 per cent preferred stock has been issued to enable the company to double its output. For many years the California industry has been delivering tractors to Cuba, Hawaii, South America, Philippine Islands, as well as to the Pacific Coast states. Recently, as an insurance against an off or dry season in the local territory, the company was prompted to seek an outlet in the East and South. The company's product is sold for cash to dealers and the expense of starting tractors and rendering service is borne by them. The company, however, sends out experts from the factory to check up service being given by its dealers and to see that users are properly instructed and assisted.

Bank Credits

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

NEW YORK, May 20—The prevalence of cut-rate retail sales in various centers indicates increasing credit strain and lends support to the belief that the peak of commodity prices has been reached.

Traffic congestion has grown more acute, resulting in further suspension or slackening of activity in industrial plants and in deferred deliveries, with consequent additional tying up of credit. Railway officials have formally requested the exercise of emergency powers of the Interstate Commerce Commission to relieve the traffic situation.

Several new rail issues have been sold readily, most of them on a 7 per cent yield basis and with maturities of ten years.

Time money rates remain practically unchanged. Call rates, which rose as high as 12 per cent last week, receded early this week to a low of 6 per cent. Treasury offering of Certificates of Indebtedness at 5½ per cent, a record high rate, supports the expectation of still higher money rates.

Federal Reserve loans on Government war paper increased $64,000,000. Total bill holdings increased $50,000,000 and net deposits $65,000,000. Note circulation decreased $9,000,000. Despite an actual gain of $2,300,000 in cash, the ratio of reserves to note and net deposit liabilities declined to 42.2 per cent. Discounts for other Reserve banks held by the Boston, New York and Cleveland banks declined by $16,300,000, the New York bank's reduction alone amounting to $8,300,000.

DOBLE TO BUILD TRACTORS

EMERYVILLE, CAL., May 12—Manufacture on a large scale, of engines, tractors, vehicles and water craft, is purposed by the Doble Company, Inc., capitalized at $100,000, which incorporated in Alameda recently. The plant and general offices will be in Emeryville. Work will be begun within the next few days on the first unit of the seven reinforced concrete buildings to be erected. The plant will be equipped to turn out various classes of engines and tractors.

Men of the Industry

George H. Layng, manager of manufacturing for the Cadillac Motor Car Co., has been appointed vice-president and a director of the company. He will continue in charge of the manufacturing department. Layng has been with Cadillac 15 years, having started in the old single cylinder days as foreman of the chassis department.

George C. Conn, general traffic manager of the Buick Motor Car Co., has been made director of traffic to succeed W. H. McCloud. McCloud resigned May 1 to join Walter P. Chrysler in the Willys corporation. A. R. Merrick takes the position made vacant in the Buick service by the promotion of Conn.

E. W. McCullough, for nine years executive secretary of the National Implement & Vehicle Association, has been named manager of the new Industrial Production department of the United States Chamber of Commerce.

S. de B. Keim has resigned from the Locomobile Co. of America, as manager of the New York branch, to become general sales manager of the American works at Springfield, Mass., of the Rolls-Royce, Ltd.

E. T. Sutton, distributing sales manager for the Denby Motor Truck Co., has been promoted to advertising manager by L. B. Graham, who recently took charge of the sales department as general manager.

D. T. Preyer has been appointed district sales manager for the Middle West district of the American Hammered Piston Ring Co., of Baltimore. He was formerly Eastern representative of the Klaxon Company.

Holden Kent has been appointed general sales agent East of the Mississippi River for the Higgins Manufacturing Co., manufacturers of automobile body moldings and stampings at Newport, Ky.

Benjamin S. Pfeiffer will be associated with the Page Co., consulting engineers of Chicago, after June 1. Pfeiffer was formerly connected with tractor and truck building in the Middle West.

John Flint, comptroller of Maxwell Motors Co., tendered his resignation effective tomorrow to devote all of his time to the interest of the firm of West & Flint, New York accountants.

P. B. Williams, who resigned some time ago as general sales manager of the Mac-Lar Storage Battery Co., has become president and general manager of the Barco Battery Co., in Detroit.

W. L. Winborn for 10 years connected with the purchasing department of the Ford Motor Co., has resigned to enter the service of the Central Gear Co., in the purchasing department.

Howard L. Spohn and Frank A. Kapp, who joined the Charles H. Fuller advertising agency April 1, have been elected vice-president and secretary respectively by the directors.

C. H. Hampton has resigned as president of the Canadian Lamp & Stamping Co., Ltd., Walkerville, Ont., to become associated with the Standard Varnish Works of New York.

A. E. Trudeau of the Fisk Rubber Co., was elected secretary and treasurer of the Engineering Society of Western Massachusetts at its first annual dinner this week.

L. S. Roscoe has resigned from the advertising department of Olds Motor Works at Lansing, Mich., to enter the publicity and advertising business in Los Angeles.

H. F. Evans, who has been assistant foreign sales manager of the Moline Plow & Tractor Co., has been promoted to export trade manager succeeding O. H. Seiffert.

C. G. Garner, traffic manager of the Stephens Motors Works, Freeport, Ill., has resigned owing to ill health. He has been succeeded by B. J. Sanford.

H. G. McComb has resigned as general manager of the Russell Motor Axle Co. He will continue sales and development work at his Detroit office.

Robert S. Fletcher has been appointed manager of sales and Frank B. Wilson, publicity manager, for the Climax Rubber Co., Columbus.

John B. Page until recently foreign sales manager of the Traffic company is now connected with the Oklahoma Automobile Mfg. Co.

L. J. Harley, Jr., president of the Harley Co., Springfield, Mass., has resigned to become president of the Springfield Coach Works.

N. S. Reed has resigned as truck engineer of the Paige-Detroit Motor Car Co., to become consulting engineer of the sales division.

Howard L. Spohn has been made a vice-president, and Frank A. Kapp, secretary of the Charles H. Fuller Co., advertising agents.

E. T. Sutton has been appointed advertising manager of the Denby Truck Co.

Duesenberg Designs Special Axle for Car

INDIANAPOLIS, May 18—Production plans of the Duesenberg Automobile & Motors Corp., which has bought a factory site in this city, call for 2400 cars the first year of operation. In addition to a special Duesenberg engine the car will be equipped with four wheel brakes and an axle designed by Fred S. Duesenberg. It is said the car will be 400 lb. lighter than cars of similar power and will get from 18 to 22 miles on a gallon of gasoline.

The following officers have been announced: Newton Van Zandt, president; L. M. Rankin, vice-president and general manager; F. A. Riley, secretary; Jacob Shaefer, treasurer; Fred S. Duesenberg, chief engineer; August Duesenberg, assistant engineer, and R. L. Freudenberger, financial representative. According to Freudenberger $500,000 worth of stock has been sold to motor car dealers throughout the country.

AERIAL TAXI COMPANIES FORM

OTTAWA, May 14—Seventeen aerial taxicab companies are being formed in western Canada, and a number of these have been already licensed by the air board. Lieutenant-Colonel Scott, who has active charge of the certificates branch of the air board, has just returned from a tour of inspection of the West, and reports great activity and possibilities for very real development of commercial flying in that part of the Dominion. Four commercial flying companies have been floated in Winnipeg, one will be formed in Brandon, an airdrome is to be built at Virden, Man.; there is one commercial flying company in Regina, one in Moose Jaw, two in Saskatoon, two in Edmonton, one in Hanna, Alta.; one in Calgary, one in Lethbridge, one in Banff, and two in Vancouver.

Passenger flying is the first object of all these companies. Mail carrying and distribution for department stores is expected to follow soon. The real obstacle to the extension of the traffic is the lack of ground organization.

Service Convention to Hold Four Sessions

NEW YORK, May 15—Service managers from all parts of the country have announced their intention of attending the convention at Indianapolis May 24-26, called by the service division of the National Automobile Chamber of Commerce, of which H. R. Cobleigh is secretary. The sessions will be held at Hotel Severin. The program follows:

Monday morning: "Report of Service Committee on Standard Repair Parts and Service Policies," E. T. Herbig, sales manager, Service Motor Truck Co., Wabash; "Report of Service Department," H. R. Cobleigh, Secretary; "Salesman's Functions in and Attitude Toward Service from Sales Point of View," F. E. Moskovics, vice-president, Nordyke & Marmon Co., Indianapolis; "What Service Department Expects of and Owes to Salesman," R. B. Perry, service manager, Allen Motor Co., Columbus.

Monday afternoon: "The Owner's Viewpoint as to His Responsibility and What He Expects in the Way of Service," E. W. Turley, manager, Service Department, Wilson & Co., Chicago; "What the Service Department Expects of and Owes to the Owner," Henry R. Selden, service manager, Selden Truck Corp., Rochester.

Tuesday morning: "Methods of Estimating and Charging for Service on a Flat-Rate Basis," P. E. Chamberlain, R. R. Hall, Cadillac Co., Denver; "Service Salesmanship," B. M. Ikert, editor, *Motor Age*, Chicago; "Y. M. C. A. Auto Mechanic Courses," H. M. Rugg, Supervisor of Technical Instruction, Y. M. C. A.

Tuesday afternoon: "Repairshop Efficiency Methods," H. G. Fitch, service manager, Willys-Overland Company, Toledo; "Stockroom Efficiency Methods," G. R. Scott, service manager, Buick Motor Co., Flint; Discussion of N.A.C.C. Service Department and its proposed activities.

Topics for general discussion: "Should Independent Repairshops Receive Discount?" "Shortage of Express Service"; "Training of Mechanics"; "What Co-operation Can Service Departments Show Tire Manufacturers for Benefit of the Owner?"; "How Large Must a Shop Be to Economically Install Compressed Air?"; "How Can Service Departments Aid Recovery of Stolen Cars?"

ELSTON FORMS BATTERY FIRM

INDIANAPOLIS, May 10—The Marion Elston Battery Co. of Marion, Ind., has filed articles with the secretary of state with a capitalization of $200,000.

Calendar

SHOWS

Oct. 6-16—New York. Electrical Show. Grand Central Palace. George F. Parker, Manager.

Dec. 10-18—New York. Motor Boat Show. Grand Central Palace.

FOREIGN SHOWS

June 21-27—Sunsvall, Sweden. Automobile Exhibition. Norrland Fair.

June 26-July 25 — Commercial vehicles, tractors, camions and engines. Antwerp.

July 9-20—London, England. International Aircraft Exhibition. Olympia. The Society of British Aircraft Constructors.

Aug. 7-Sept. 15 — Motorcycles, sidecars, etc. Antwerp.

October—London. Commercial Vehicle Show, Olympia.

November—London. Passenger Car Show, Olympia.

CONTESTS

May 31 — Indianapolis, Ind. Speedway.

May 31—Brockport, N. Y. Dirt track.

June 12—Uniontown, Pa. Speedway.

June 14—Omaha, Neb. Truck Reliability Run.

June 17—Portland, Ore. Dirt track.

June 17-18—Chicago, Inter-Club Run, Chicago Automobile Club.

June 19—Ogdensburg, N. Y. Dirt track.

July 4—Tacoma, Wash. Speedway.

July 4—Hanford, Cal. Dirt track.

July 4—Spokane, Wash. Dirt track.

July 5—Batavia, N. Y. Dirt track.

July 17 — Warren, Pa. Dirt track.

July 24—Watertown, N. Y. Dirt track.

July 31—Fulton, N. Y. Dirt track.

Aug. 7—Erie, Pa. Dirt track.

Aug. 14—Buffalo, N. Y. Dirt track.

Aug. 20-21—Middletown, N. Y. Dirt track.

Aug. 21—Johnstown City, Pa. Dirt track.

Aug. 21—Elgin, Ill. Road race, Chicago Automobile Club.

Aug. 28—Canandaigua, N. Y. Dirt track.

Aug. 27-8—Flemington, N. J. Dirt track.

August, 1920—Paris, France. Grand Prix Race. Sporting Commission Automobile Club of France.

Sept. 1—Glidden Tour—N. Y. to San Francisco.

Sept. 5 — Targa Florio Race, Sicily.

Sept. 6—Hornell, N. Y. Dirt track.

Sept. 6—Cincinnati, O. Speedway.

Sept. 6—Uniontown, Pa. Speedway.

Sept. 17-18—Syracuse, N. Y. Dirt track.

Sept. 25—Allentown, Pa. Dirt track.

Oct. 1-2—Trenton, N. J. Dirt track.

Oct. 8-9—Danbury, Conn. Dirt track.

CONVENTIONS

May 24-26—Indianapolis, Service Managers' Convention. National Automobile Chamber Commerce, Service Division.

June 7-10 — Indianapolis, Ind. Annual Convention of the Associated Advertising Clubs.

June 7-11 — Del Monte, Cal. Automotive Equipment Association, Directors' Meeting, 7-8; General Sessions 10-11.

June 22-25—Asbury Park, N. J Annual meeting American Society for Testing Materials.

S. A. E. MEETINGS

June 21-25 — Ottawa Beach, Mich. Summer Conference.

Army Truck Convoy Will Study Highways

WASHINGTON, May 15—Plans have been completed whereby the War Department will send a motor convoy from Washington to Los Angeles over the Bankhead National Highway on or about June 15, due to arrive in Los Angeles Sept. 1. The convoy will be under the supervision of the Motor Transport Corps. All motor trucks will be one and one-half tons capacity, equipped with pneumatic tires.

The tour will start from Washington, passing through the following states: Virginia, North and South Carolina, Georgia, Alabama, Mississippi, Tennessee, Arkansas, Texas, New Mexico, Arizona and California, ending at Los Angeles.

The purpose of this and other overland trips will be to study the handicaps which surround the transportation needs of the army on account of the lack of dependable and definite systems of highways; to secure data relative to the use of various types of motor vehicles and to secure relative data on solid and pneumatic tires.

BELDING INDUSTRIAL UTOPIA

DETROIT, May 15—Searching for a site for its new plant, the recently organized Jacquet Motors Corp. discovered Belding, Mich. The company representatives investigated and decided Belding was as near an industrial Utopia as could be found. The labor situation was one factor taken into account. In Belding are large silk mills in which 1500 young women are employed. It was found many of them were sisters and sweethearts of automotive mechanics employed in other places. Workmen flocked to Belding.

Living costs also were taken into account. Rooms may be had in Belding for $1.50 and $2 a week and board for $5 and $6. Shoe stores display wares ranging up to $7 in price and clothing stores charge $25 and $30 for a suit. Profiteers are given a limited time to get out of town. There never has been a strike in town and discontented workers are urged to depart.

Goodyear Film Shows Provisions for Future

NEW YORK, May 15—The first showing of a series of motion pictures visualizing the production of tires from the raw material to the finished product was shown at the Broadway Theater this week. These pictures are taken at the various divisions of the Goodyear Tire & Rubber Co. and were made by the Universal Film Mfg. Co.

The pictures are particularly noteworthy on account of showing the great development under way in various parts of the world in the effort to increase the production of tires and to better the quality.

The first showing of the picture occupied nearly 2½ hrs. and the picture needs considerable editing before it can be released to the public. There are quite a number of repetitions and the processes do not run as consecutively as they might. This will undoubtedly be taken care of before the release is given.

CHEMICAL ENGINEERS TO MEET

NEW YORK, May 15—The semi-annual meeting of the American Institute of Chemical Engineers will be held June 28-July 3. The first two days' sessions will be held in Montreal and a special train will be provided during the remainder of the meeting for visiting Canadian chemical industries. June 30 will be spent in Ottawa, July 1 in Belleville, Ontario, July 2 at Shawinigan Falls, July 3 at La Toque, July 4 in a trip down the Saguenay river and July 5 at Quebec.

Baughman Salesmen To Visit Factories

TAMPA, May 8—From time to time manufacturers have invited jobbers to their factories in order to show the trade how merchandise is produced. The G. Norman Baughman Co. is going this plan one better and is going to take its 13 traveling men to all of the big manufacturers which Baughman represents in the state of Florida. These factories are 23 in number and are located in Atlanta, Toledo, Detroit, Cleveland, Milwaukee, Indianapolis, Chicago and St. Louis. The trip will last two and one-half weeks. The men will be in charge of Purchasing Agent Stanley K. Wallace. It is Baughman's belief that this trip will aid materially in the type of representation his salesmen will be able to give to the merchandise they sell, in that they will know all about the factory behind the goods and the manner in which they are produced.

METROPOLITANS HAVE SPECIAL

NEW YORK, May 15—Arrangements have been made by a committee of the S. A. E. Metropolitan branch, in co-operation with the Pennsylvania and Buffalo sections, for a special train to the S. A. E. summer meeting at Ottawa Beach. It will be a section of the Black Diamond Express over the Lehigh Valley and Grand Trunk roads which will leave New York at 9.30 a. m. on June 20. The Pennsylvania section will join the Metropolitans at South Bethlehem.

MULFORD TO DRIVE SPECIAL

INDIANAPOLIS, May 18—"Smiling Ralph" Mulford, one of the few drivers who has faced the starter in every 500-mile race at the Indianapolis Motor Speedway, has entered a Mulford Special in the Eighth International Sweepstakes to be held at the Speedway, Monday, May 31.